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FEBRUARY 1966

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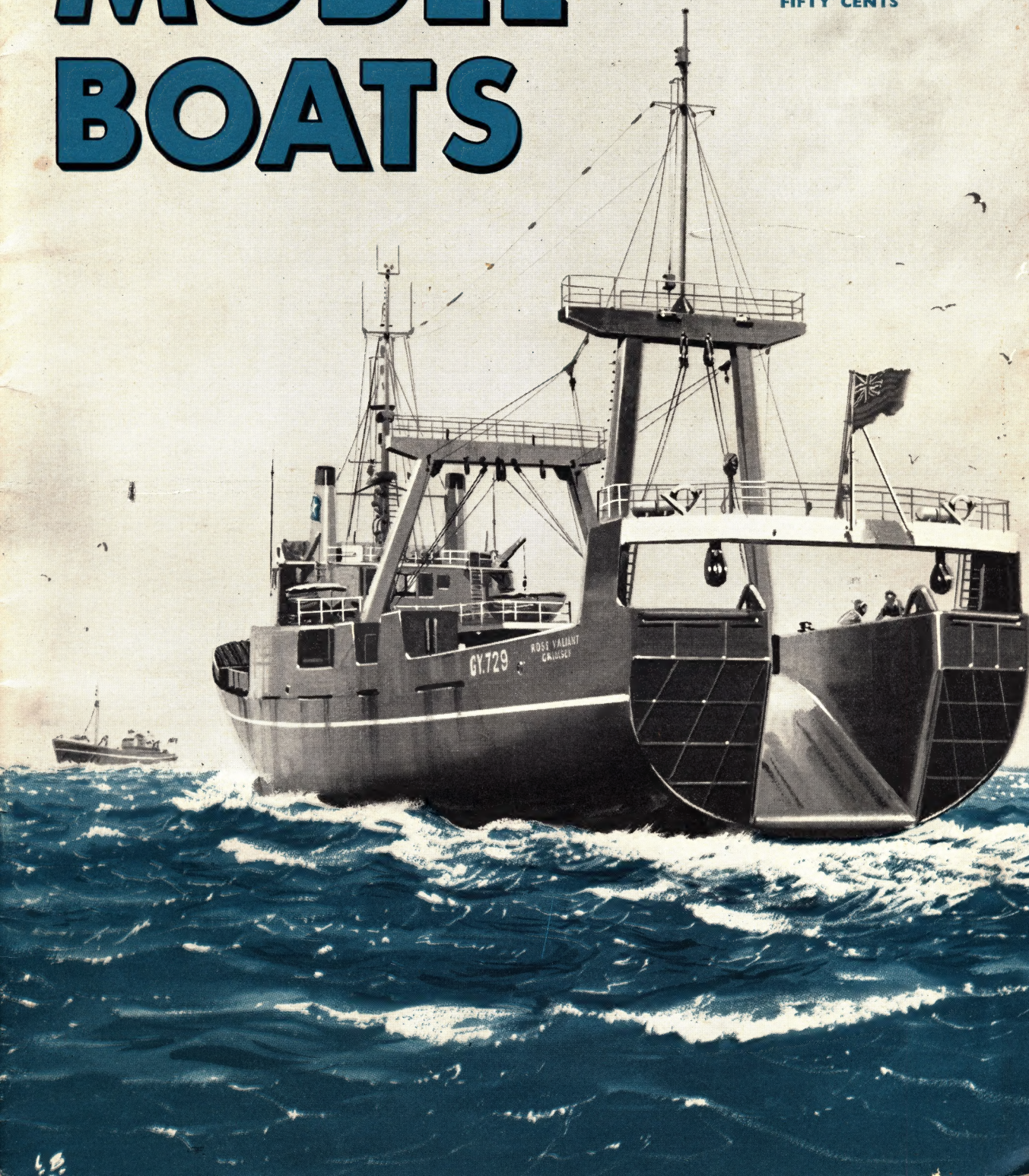
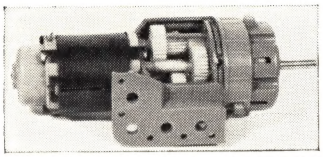


IF IT'S **RipMax** IT'S GOOD!

THE WORLD'S FINEST SELECTION OF —ELECTRIC MOTORS—



RICHARD 6-SPEED MOTORS

Fitted 6-speed gearbox with fingertip selection—a complete marine power unit suitable for all types of model.

RICHARD I (Monoperm motor) 3½" x 1¼" dia. Weight 4 oz. **49/6**

RICHARD II (Monoperm Super) 4" x 1½" dia. Weight 5½ oz. **57/6**

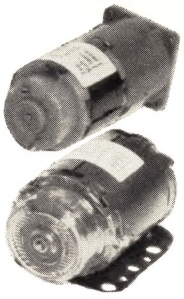
MINIRICHARD (Milliperm) 2½" x ⅞" dia. Weight 1¼ oz. **47/6**

GEARBOXES also available separately. RICHARD **27/6** MINIRICHARD **25/6**

"MARX" MOTORS

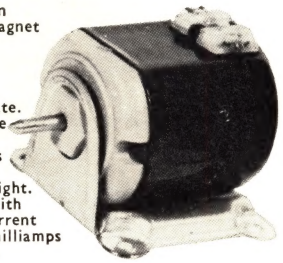
Precision-built motors in a range of six basic sizes from sub-min up.

Nanoperm 75—3v., ¼ oz. **25/0**
Nanoperm 75WG—geared **34/11**
Nanoperm 25—6v., ¼oz. **25/0**
Nanoperm 25WG—geared **34/11**
Nanoperm 25WGL—loco gear **37/6**
Microperm 60—1" x 11/16" dia. 3v., straight drive **22/6**
Microperm 20—6 volt **22/6**
Microperm 20WG—geared **28/6**
Milliperm 40—1⅛" x ⅞" 3v., straight drive **21/0**
Milliperm 15—6 volt **21/0**
Monoperm Super—2" x 1⅛", 4v. or 6v. versions **32/6**
Decaperm 2½ x 1½, 3-12v. **44/11**
Hectoperm 2½ x 2, 3-12v. **58/6**



"RMA" SUPER Q ORBIT

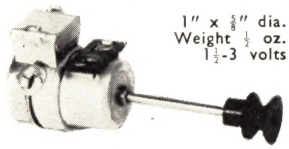
Compact twin permanent magnet motors with replaceable brushes. Detachable mounting plate. Develop more power than other motors of the same size and weight. High revs with moderate current drain. 250 milliamps free running.



There's a size to suit any hull!

ORBIT 105: 1½-3v, ⅞ x 1⅛, ¾ oz. **5/11**
ORBIT 205: 1½-3v., 1 x 1⅛, 1 oz. **6/3**
ORBIT 305: 1½-3v., 1 1/16 x 1¼, 1½ oz. **6/11**
ORBIT 405: 1½-9½v., 1⅛ x 1⅜, 1¾ oz. **8/11**
ORBIT 505: 1½-9½v., 1¼ x 1½, 2¼ oz. **10/11**
ORBIT 605: 4½-10v., 1⅜ x 2⅛, 4¾ oz. **39/6**

RMA SUPER Q ATOM

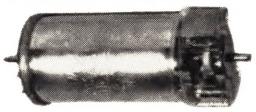


1" x ⅝" dia. Weight ½ oz. 1½-3 volts

A superb little motor which fits the smallest of models, ideal for motorising plastic kit models **3/11**

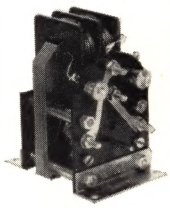
RMA SUPER Q "BABY"

1⅛" long plus ⅜" shaft ½" dia. Illustrated approx. full size above, this tiny unit is specially made for motorising plastic aircraft, etc. Weight ½ oz. 1½-3 volts DC **6/6**



DISTLER . . . 29/11

Originally developed for industrial use, this is a precision motor noted for LOW CURRENT CONSUMPTION. 2¾" long by 1" dia. Works on 1½-6 volts. Draws less than 15 mA no load current.



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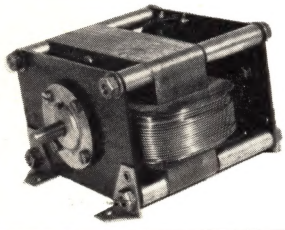
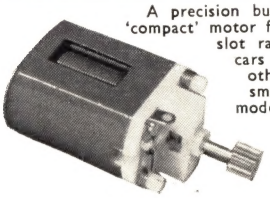
METEOR—6-12 volts **51/8**
STANDARD—6-12 volts **78/11**
SUPERMARINE—6-12 volts **99/11**
DOUBLE SUPERMARINE SPECIAL 6-12 volts **126/9**





A precision built 'compact' motor for slot race cars & other small models

"RMA" COMPETITION SPECIAL

Wound for 12 volt, high power performance. 1½" long x 1" x ⅝" Weight 1 ounce **14/11**

These MICROMAX MOTORS are superb miniature engineering productions, ideal for servos, etc.

TO 3 (2-4v.)
With built-in 60:1 gearbox **79/6**
With built-in 15:1 gearbox **87/6**
Built to the same standards as a watch!

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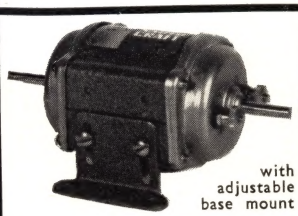
Micro-miniature motor, only ⅝" dia x ⅝" long. Take plug-in gearboxes.
41:1 **19/6**
141:1 **21/6**
485:1 **23/6**



with adjustable base mount

NAUTOCRAFT . 72/6

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INBOARD-OUTBOARD
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BONGO 1 ... ... **42/6**
Monoperm motor
BONGO II **50/0**
Monoperm Super motor

SUPER NEPTUN

Height 5½", 240 degree pivot steering, on - off - reverse switch **32/6**

NEW OB-300

Real value for money

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Powerful & dependable

True scale unit 4½" high 4½ volt motor 2½ oz. thrust **34/11**

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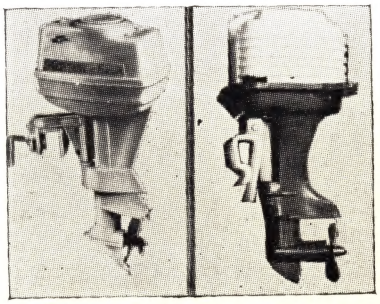
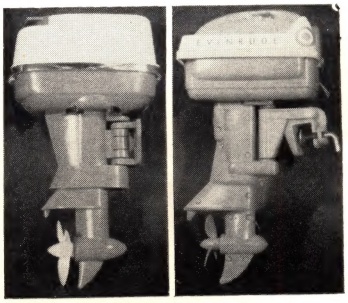
Like the real thing

Scale outboard, 4½ volts, 2½ oz. thrust. Height 4½" **36/0**





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MODEL MAKER & MODEL BOATS

MAP HOBBY MAGAZINE

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Aeromodeller and Model Maker Plans Service

M.A.P. Technical Books

February 1966

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On the cover . . .

Laurie Bagley's thoughts on "Ross Valiant", the distant water refrigerated trawler described inside, pictured here in her icy hunting grounds. Trawler in background is "Ross Tiger", a conventional vessel.

Next month . . .

Powerful M.T.B. cover painting will relate to a big feature of the March isue—plans for a 38½ in. semi-scale torpedo boat which joins M.B. plans range. In support will be full size plans for a sailing Chinese Junk, plus a new "A" Class heavyweight, and a superb sailing model of "Fubbs", Charles II's Royal Yacht.

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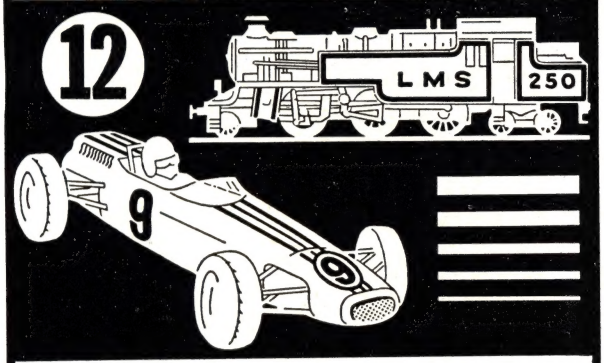

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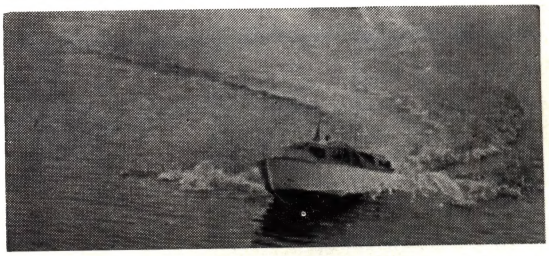

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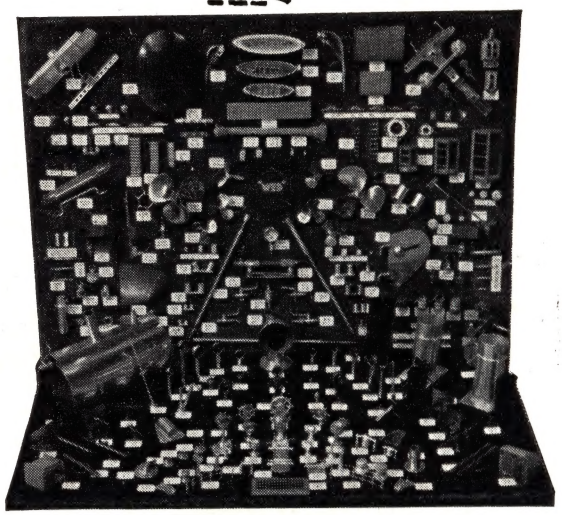

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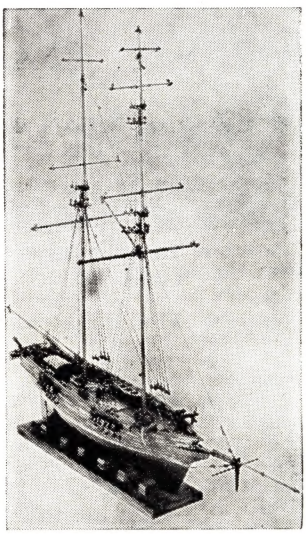

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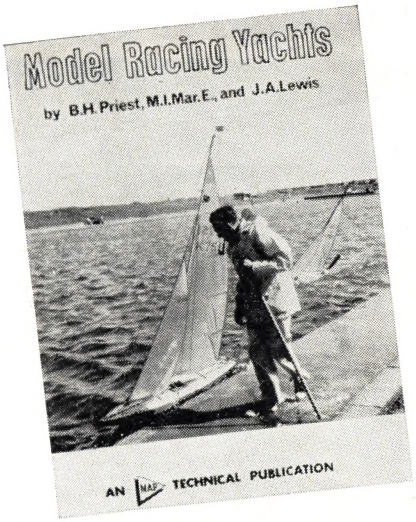

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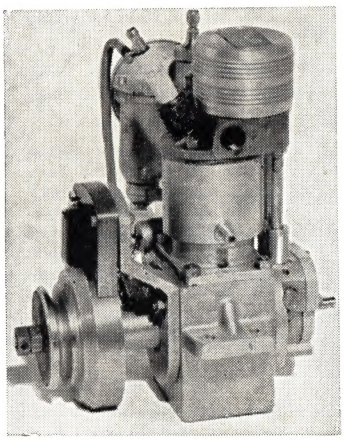

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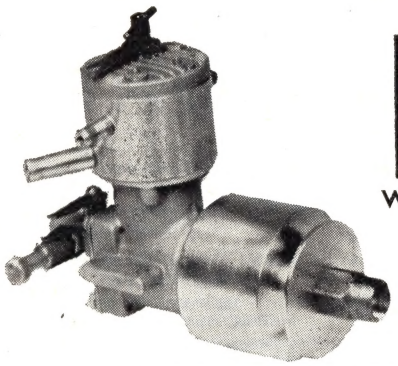

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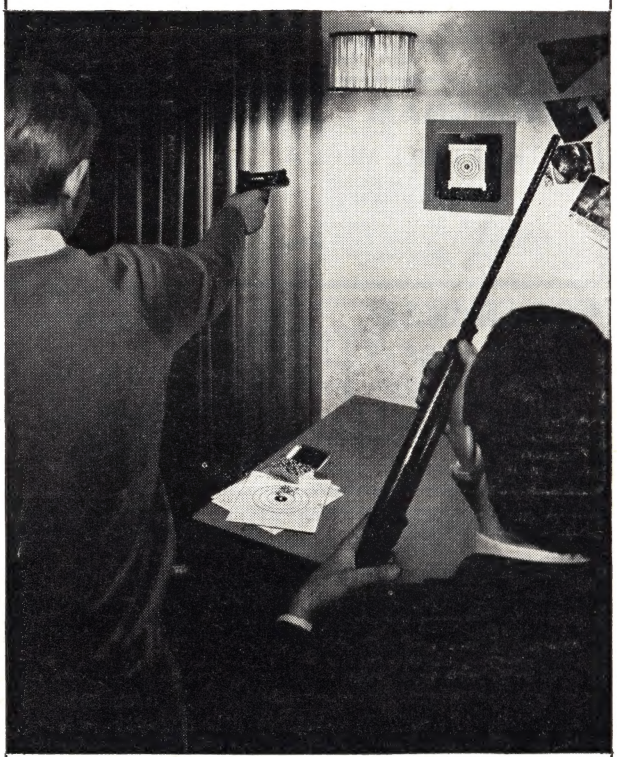

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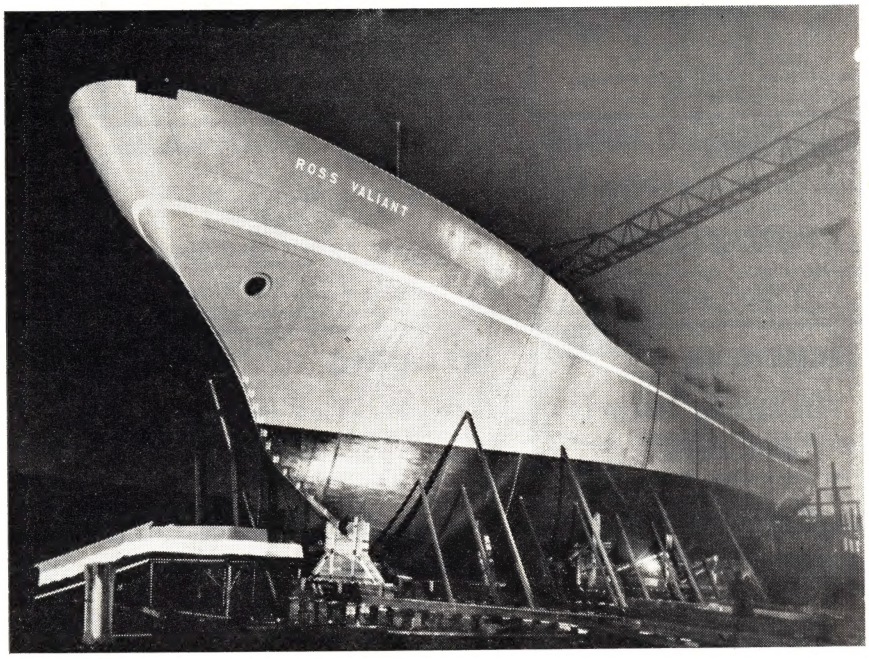


ALTHOUGH it is only two days from publication date, this is the first opportunity we have had of mentioning the Annual General Meeting of the Model Power Boat Association, which is being held at Camden Town Hall, Euston Road, London, on Sunday, January 30th, starting at 2 p.m. Camden Town Hall is right opposite St. Pancras railway station, by the way.

On the agenda are a number of relatively minor rule changes, many of which are designed to tighten up regatta organisation, and a proposal for a "vintage class" hydroplane category. As might be expected, the majority of propositions put forward relate to radio control—some eleven, against four of general application and the hydroplane one mentioned. We say "as might be expected", since radio boats are still the newest branch of the M.P.B.A., and it is probably reasonable to estimate that something like two-thirds of the total M.P.B.A. membership run radio boats only. As always, it will be an interesting meeting, and we hope to cover the main points in our next issue.

Sits vac

Those readers who also keep abreast of model cars may have noticed that our sister magazine *Model Cars* has "taken over" *Model Boats* staff member Alec Gee. Alec is one of those comparatively rare people, a modeller with great interest and ability in several spheres of modelling; he has always been a keen car enthusiast, and will certainly fit his new niche admirably. It does, of course, leave *Model Boats* short of an editorial assistant, and anyone interested and within reach of the specifications is invited to write in for an interview. The specifications? Around 19-20 or a little more, a modeller primarily interested in boats, able to write and punctuate reasonable English, within travelling distance of or prepared to live in Hemel Hempstead; enthusiasm and ability to learn go without saying. Prospects are good and depend largely on the person himself.

We also need a similar type for *Model Engineer* staff. All the above applies, except that the applicant's interest should lie in the field of model engineering and he must have some knowledge and experience in lathework, etc. If either position sounds like you, write to the Editor with brief details and we will take it from there.

Heading picture

The modern form of trawler with a stern ramp is being seen in increasing numbers and is certainly interesting and, from what we have seen of trawling, logical. Commander Moore provides a drawing and article on one of these vessels in this issue, and the dramatic photograph above should be of great help to anyone modelling a full-hull version, whether static or working.

We saw a recent television programme on trawling and noted one most interesting fact; the bottom edge of the trawl has half a dozen cowhides bent to it to take the wear of the trawl dragging over the sea-bed. Apparently no substitute has been found which does the job as satisfactorily. Having been on a trip or two, years ago, with a small inshore trawl over a basically sandy bottom, we can vouch for the wear, which is quite remarkable.

Vospers

We note that negotiations are going on at the time of writing for a "take over" of Thornycrofts by Vospers. These two firms are best known for their fast small craft, though, of course, Thornycrofts, have built a considerable number of larger vessels—destroyers, and so on. In an age of big combines and a slight but steady movement towards standardisation, such a marriage should be a happy one. A big

variety of hulls for the same general sort of job must put costs up and standardisation, or reduction to a small number of identical hulls capable of accepting different superstructures, accommodation, and power plants should certainly help in providing competitive tenders to the many countries who still acknowledge that British yards produce the best there is.

Foreign Modellers

The increase of model boating interest in Eastern Europe manifests itself in various ways, from greater participation in international regattas to quite a number of Christmas and New Year greeting cards sent to *Model Boats* by modellers in Russia, Hungary, Yugoslavia, Poland, Czechoslovakia, and so on. Hungary seems to be a real hot-bed of activity at the moment; unfortunately currency regulations make it difficult for modellers to obtain goods and reading matter from the West, and we have recently had appeals from three Hungarians for any old issues of *Model Maker & Model Boats*. Any reader who has copies no longer required would do his bit for international friendship by sending a few to Gerencser Sz Tibor, Hungary Magyarnepkoztarsasag, Oroshaza (Bekes VM) II Sztalingradi—U—18 Nr. (who wrote in German), Nemeth Jancs, Tatabanya IV, Viola U 20/1, Hungary, or Kalman Szabo, Szazhalombatta, DKV Lakotelep, 1, ep IV em 1, both of whom write in excellent English. Note, incidentally, that as is customary in several countries, Christian names follow surnames in these instances.

Loss to Yachting

We regret to record the death of the "father of Belgian model yachting", M. G. Heydt, of Antwerp, on December 4th, aged 74. He was possibly the last survivor of the first international model yacht race ever held at Enghien-les-Bains, France, in 1913, and competed regularly for the Y.M. Cup between the wars. His encouragement and presence at internationals since the last war (he was last at Fleetwood in 1959) did much to advance the standard of Belgian yachting, now equal to most countries. He was president of the Royal Antwerp M.Y.C. and the Belgian Federation, and Vice-president of the I.M.Y.R.U. With his death, the international scene loses a leading figure and all yachtsmen lose a good friend—G.V.H.

Model Yachts at Midlands Boat Show

At a Boat and Holiday Show planned for February 11th to 26th at the Bingley Hall, in Birmingham, twenty-five model yachts of all classes will be on show on the combined stand of the Bournville Model Yacht and Power Boat Club and the Birmingham Model Yacht Club. Staged under the auspices of the *Birmingham Post and Mail*, the show, which will mainly feature full size craft of every sort, is hoped to be the finest exhibition of its type ever held in the Midlands. Needless to say, all yachting enthusiasts, either local to the area or in the vicinity during "Show Week", will be welcome on the stand where problems can be discussed, tips passed on, etc. Make a note of the dates.

Regatta Dates

Another regatta to add to the diary for the 1966 season is the first leg of the annual Lancs. v. Yorks. battle, the Roses Regatta, to be held at Keighley Tarn on June 26th.

Look out for the full list of meetings so far arranged which will be appearing in our next issue.

People

Quite a number of boat modellers in the London area will know Len Hooley, who for some months has been dispensing goods and advice in Chelsea, at Models and Toys in the Kings Road. This shop is now closing and Len will, from Feb. 1st., be dispensing just as enthusiastically from behind the counter of Ripmax's retail shop at 39 Parkway, Camden Town.

Poole

The ever popular Poole radio regattas have been fixed for May 7/8th (power boats), June 11/12th (R/C yachts) and September 10/11th (R/C yachts).

Boat Show

Visitors to Earl's Court were once again treated to a feast of marine exhibits at the 1966 Boat Show; one item intriguing to modellers was the Shell-Mex and B.P. mini-power boat race, where half a dozen tiny power boats were raced under radio control. Geoff Chapman, who was responsible for the radio and technical side of this crowd-drawer, has written us an article on the models etc., which we shall be featuring in our next issue.

Plastic Fuel

We were intrigued to note that Keilkraft Nitrex 15 glow fuel is now being packed in a plastic bottle —a "Poly-tainer" made by the Plastics Group of The Metal Box Company Ltd. The bottle is blow-moulded in yellow low-density polythene and the long thin spout in high density green polythene. No doubt if this first pack proves successful, other fuels will be sold in the same way. This will save modellers the trouble of decanting their fuel into a used Squeezy or Fairy Liquid container! There is no doubt that such squeezable containers are of value for filling tanks, etc. (particularly with that long spout) and the empty containers are of further use for sucking odd bilge water etc., out of boats. Again, that long spout will prove a blessing. The spout has a reclosure cap, so that the more volatile constituents of the fuel will not suffer. Altogether a move welcome to modellers and which should prove highly successful for the manufacturers.

International Regattas

Notification of the following regattas has been made.

19-22 May, Vienna, Austria R.C. power boats, 10th Anniversary regatta. Entry by March 31st. Details, etc., Modelebaugruppe BAV-HOLZ, Jugendabteilung, Vienna 1, Ebendorferstrasse 7.

10-12 June, Kolin, Czechoslovakia, R.C. power boats, entry by May 10th. Details Zentrale Modellbausektion der CSSR, Abteilung fur Schiffs Modellbau, Opletalova 29, Prague 1.

9-10 July, Hanover, W. Germany, Sweden v. W. Germany, R.C. yachts.

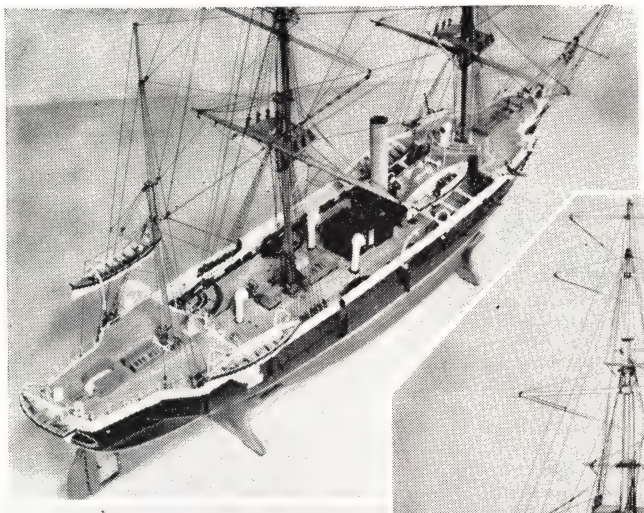
29-31 July, Ulm-Donau, W. Germany, R.C. and straight running power boats. Details Modell-Bau-Club-Ulm, 79 Ulm-Donau, Postfach 523.

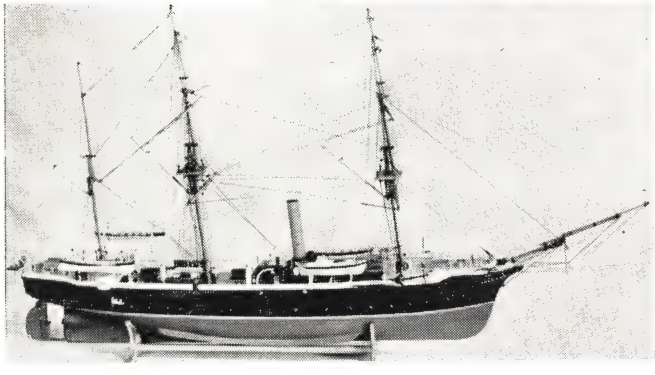
Prices

As from January 1st, 1966, the little ½ oz. tinlets of Humbrol enamels, etc., cost 10d. against 9d. and the 2 oz. tins go up to 1s. 10d. One expects such small increases these days, and few modellers will grudge an extra penny, especially those who have been at it long enough to remember how hard it used to be to buy tiny quantities of good quality enamels.

H.M.S. WILD SWAN

A superb sailing model sloop by M. Garnett





The Reason for the Choice of Prototype

AFTER completing a successful sailing model of a 12-gun brig made to Harold Underhill's drawings, followed by a study of sailing model square riggers produced by fellow enthusiasts, I came to the conclusion that a model of any of the less extreme nineteenth century ships could be made to sail reasonably. Any inherent out of balance of the prototype sail plan could be countered largely by varying the shape of an external detachable false keel, and this, combined with adjustment of sail disposition and settings, should enable simple courses to be sailed without recourse to automatic steering devices.

The apparent difficulties of marrying sail and steam, together with the challenge of the lack of published detailed information, encouraged me to consider a model of one of the transitional period warships. Besides giving me a much better insight into the ships of this period, there was the added advantage that should my ideas on sailing prove to be wrong, the model could readily be converted into a propeller driven version.

The final choice was precipitated by the photograph of a model of the *Wild Swan* in G. P. B. Naish's "Picture Book of Ship Models" (H.M.S.O.). Naturally the existence of such a model would prove invaluable, should the results of my researches on the prototype fail to produce detailed information.

The Prototype H.M. Sloop Wild Swan

The *Wild Swan* was one of a class of five medium sized sloops which were laid down in 1875. These were designed by Barnaby and were 170 ft. between perpendiculars and 36 ft. beam, with a displacement of 1,130 tons. Amidships, they were very full in the bilge, but then tapered sharply towards both bow and stern, accompanied by an equally sharp rise of floor in both directions. The object of this was to combine handiness with speed, but whilst the ships were indeed very handy, their best speed of 11.8 knots was less than their ten year old predecessors.

The sloops were all of composite construction with teak planking over iron frames, and carried wide bilge keels and copper sheathing. Internally they were divided into five major compartments by four iron watertight bulkheads which extended up to the upper deck. They were also the first ships in the British Navy to be fitted with swinging glass scuttles in place of the former square hanging ports of wood which effectively blacked out the living quarters when closed.

The *Wild Swan* was built at Napier's yard on the Clyde and was launched in 1876. Originally she was fitted with somewhat indifferent simple pressure return connecting rod engines with 45 in. cylinders by the Hawthorn Company, which gave only 10¼ knots on trials, accompanied by frequent overheating. Subsequently, this machinery was replaced by an

Admiralty built compound pressure engine with a 38 in. h.p. cylinder, a 66 in. l.p. cylinder and a stroke of 2 feet. Steam was supplied by three double ended cylindrical boilers working at 60 lb. The propeller was two bladed 13 foot diameter, and was driven at a maximum of 110 r.p.m. It was mounted on its own short shaft with a simple dog clutch at the forward end which engaged the end of the propeller shaft proper. For sailing, the propeller was hoisted on a U-shaped bracket into a well under the poop deck. The tall funnel would be reefed right down when sails were being used.

The class was barque rigged on three masts with a total plain sail area of 14,800 sq. ft. One of the peculiarities of the transition period was that the position of the masts generally was dictated by the engine and boiler layout, and this resulted in the sail plan tending to be too far aft. In consequence, ship rigged vessels would have excessive weather helm under sail and many rigged as such had to be reduced to the less powerful barque rig after trials.

As first armed, the *Wild Swan* mounted two 7 in. R.M.L. guns on traversing carriages so that these could fire on either broadside, and four 64 pounder R.M.L. guns, two on traversing slides under the poop and topgallant forecastle decks, which could fire out of embrasured ports on either side. The two remaining guns were on ordinary trucks on broadside ports. By this arrangement, it was possible for five guns to be brought into action on either beam, giving the very formidable broadside, for a sloop, of 432 lb. Unfortunately, the arrangement also caused a heavy list towards the target which seriously reduced the maximum possibilities of elevation and range. After 1884 therefore, the sloop was re-armed with 6 in. breech-loaders at opposite ports on the quarterdeck, plus two 5 in. breech-loaders on each broadside, and similar guns on traversing carriages at the bow and stern embrasures. Whilst the ship could still only bring five guns into action on one side, the list towards the target was almost eliminated. The individual broadside weight was reduced to 280 lb., but the much quicker rate of fire with the breech-loaders almost doubled the original rate with the muzzle-loaders, besides giving a substantial increase in range.

The *Wild Swan* was first commissioned in 1877, and served three four-year commissions in the Pacific until 1898, when she was laid up in reserve for six years. In 1904, she was fitted for harbour service as a stationary R.N.R. drill ship at Aberdeen and renamed *Clyde*. In 1913 she was transferred to Rosyth to be stationary flag ship. During the 1914-18 war she served as a depot ship to the local destroyer flotilla at Rosyth, and was finally sold out of the Navy in 1920.

Research

My task was simplified enormously when the National Maritime Museum was able to supply me with photostats not only of the sheer draft, but also with deck plans and elevation of the ship as fitted in 1885 and 1892. Most unexpectedly, these showed that the sloop then had an "electric light projector" mounted on its own platform abaft the foremast, and also machine gun stands towards bow and stern. The Museum also took some more photographs of its own model for me, whilst the deputy curator, Mr. A. H. Waite, gave invaluable help and advice.

The Imperial War Museum supplied a useful photograph of the prototype (Neg.Q.42562) taken about 1890, together with views of other ships of the class.

A search for details of the main guns resulted in the finding of a most useful article on the class by the late Admiral Ballard, published in *Mariner's Mirror* for January, 1939. Besides a detail of the Vavasseur broadside gun mounting, the article included a sail plan and dimensions of the mast and spars.

At this stage, it was evident that the *Wild Swan* and her sisters all had clipper bows, whereas the Greenwich model showed a vertical bow with the bowsprit stepped above the topgallant forecastle deck. After consultation with the Museum, we agreed that the model is not of the *Wild Swan*, but is probably either the *Miranda* or *Dotterel*, which were in a group of later sloops of the same class.

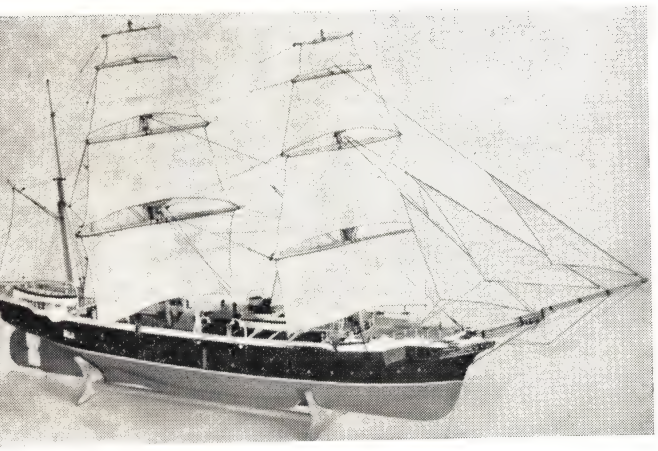
Rigging details were obtained by careful reading of Nares' Seamanship Handbook, and other manuals of the period, combined with careful studies of other museum models.

Building the Model

I decided to build to a scale of 6 ft. to the inch, which always seems to me to be a more logical scale than the more common $\frac{3}{16}$ in. one. The calculated displacement worked out to be just under 7 lb. which is light for a sailing model, and it was evident that very careful attention to weight would be needed. A target of $3\frac{1}{2}$ lb. was set for the model itself, which would allow $3\frac{1}{2}$ lb. in the detachable external keel, and as the sailplan was relatively low in relation to the length, I did not expect any difficulties with stability, provided, of course, that I could keep to my target weight.

The hull was cold moulded from three crossed layers of $\frac{1}{32}$ in. obeche, and is completely frameless. The method is one I consider to be ideal for any round bilged hull, and is simple but tedious. Hardboard shadows were mounted on a base board at about one inch pitch with $\frac{1}{8}$ in. balsa frames at the extremities. A fabricated keel with bow and stern members is slotted in, together with $\frac{1}{8}$ in. square inwales and bulwark rails. The first layer of obeche

Contrast between ship with funnel and ship carrying sail is most marked. Hull length is approximately 30 in., detail up to the very high standard of Michael Garnett's previous models.



is laid fore and aft, and is glued to filling blocks along the keel, and to the two balsa bulkheads where the planking stops. The second layer of obeche is laid transversely, holding it down with household pins whilst the Aerolite sets. The bow and the stern shapes beyond the balsa bulkheads are then completed with balsa blocks, after which the final skin is laid fore and aft from stem to stern in scale width strips. The hull showed no signs of springing as the hardboard shadows were removed, but to avoid any trouble, deck beams were fitted progressively as the shadows were taken out.

The deck had an underlay of $\frac{1}{32}$ in. balsa sheet for watertightness, on top of which a deck was laid in $\frac{1}{32}$ in. obeche strips. Deck caulking was represented by pre-painting one side of each strip before laying.

Deck houses etc., were built up from sycamore veneer on top of a $\frac{1}{16}$ in. balsa core to minimise possible warping, whilst bristol board was used for the funnel and engine room casing, gun carriages, boats, etc. Care was exercised to ensure that detail was made of the lightest possible material consistent with a proper appearance and function, and further weight was saved by cutting away all the unwanted material which was accessible.

The false keel was made up from two layers of $\frac{3}{32}$ in. ply sandwiching a brass tongue which fitted up inside a slotted recess in the keel. The tongue was retained by a pin running athwartships, access to which was obtained by a large hatch in the deck round the engine room casing. An $\frac{1}{8}$ in. propeller shaft in a longish stern tube was incorporated in the keel, with a small hatch over the forward end of the shaft to give access to the future motor coupling and gearing.

The lower masts, etc., were carved from yellow pine and stepped on the keel, whilst the royal masts and spars and the flying jibboom were made in bamboo. All the rigging was in Terylene thread in various thicknesses, and laid up where necessary. I found this a difficult material to handle with its persistent springiness, but hope that it will be long lasting. Unlike my previous brig model, the masts, etc., are not detachable, partly as the class has rather awkward inside chains, and partly because I wanted to run more ropes down the mast to avoid a bare look. Braces for the square yards run from the appropriate yard arms and through a block on the mast behind, before being led to the opposite yard arm. Tension is maintained by a short length of elastic inserted in the brace. The main brace was omitted and only the preventer brace fitted so that all the square yards can be swung easily from tack to tack. Bowsie adjustment is fitted on the spanker and headsail sheets. Elastic is used for the fore and main trysail sheets, the ends being simply hooked over a convenient projection on the model. The course sheets are hooked into loops on endless lines running down each side of the hull.

All the sails were made in washed out tracing linen by my wife. Lines of fine stitching are used to represent the cloth seams and the reef bands, and a thread bolt rope is sewn round the edge of each sail. A thin brass wire is attached along the heads of the square and trysails, with hooks and elastic loops so that these can be held against the appropriate yards. The head sails are hanked to their own halliards, and have an elastic tensioner, and hooks at either end for attaching to the model.

The rudder is scale size and is weighted and free swinging. Particularly with the hole for the propeller immediately forward, I did not think the rudder would ever be effective, except when the model is taken aback. Then the rudder will move to one side and help swing the model back on course.

The colour scheme is the usual red underwater body, black topsides, white inboard works and buff funnel. Matt Humbrol was used exclusively, with a drop of linseed oil added to give a slight gloss on the topsides. Deck houses are french polished, masts, spars, and decks are varnished lightly.

When completed the model weighed 3.4 lb., so half cylinders of lead were attached along the bottom of the false keel to bring the weight up to 7 lb.

No propeller has been fitted yet, mainly because my three attempts to date have not looked right.

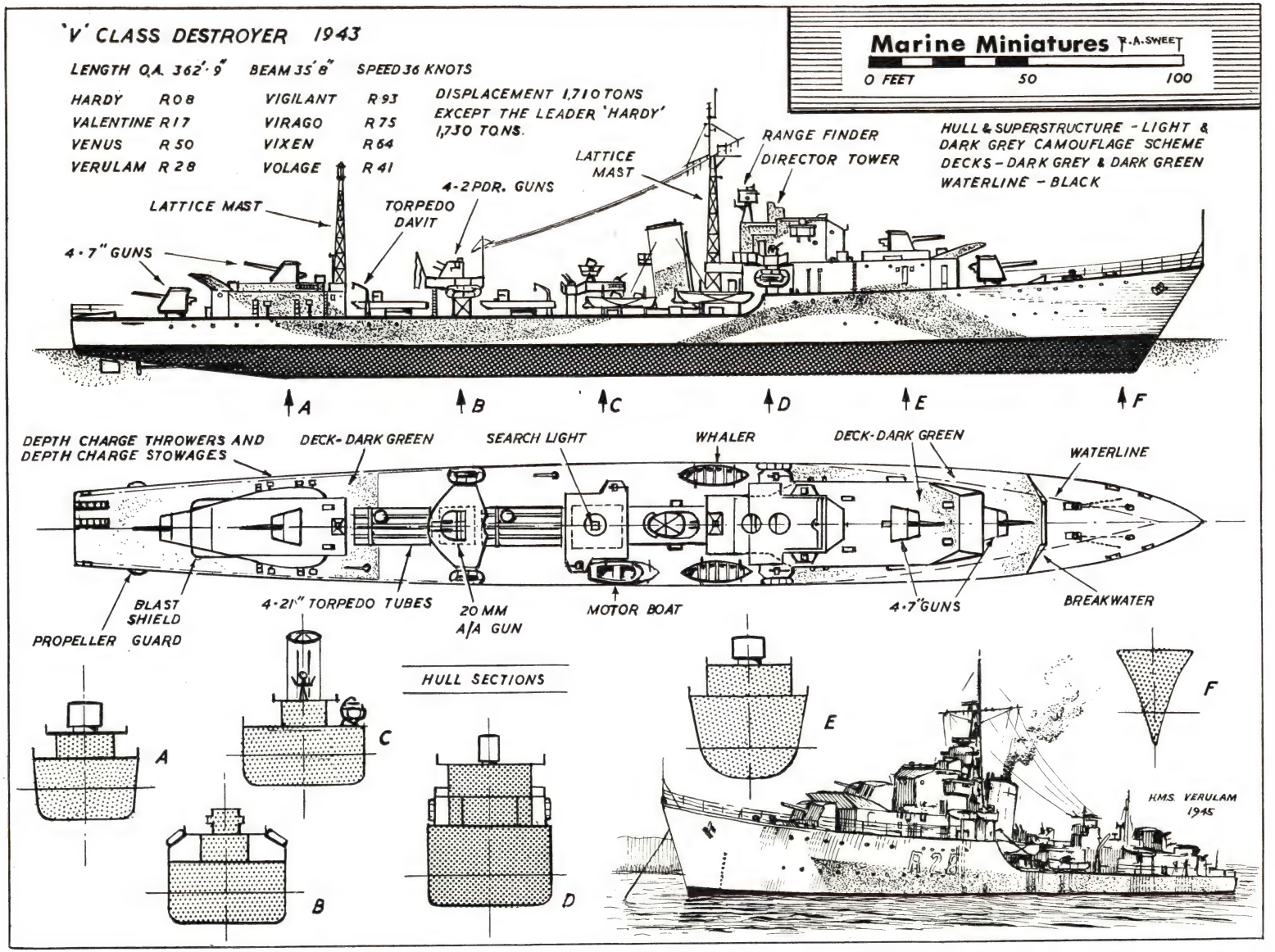
Sailing the Model

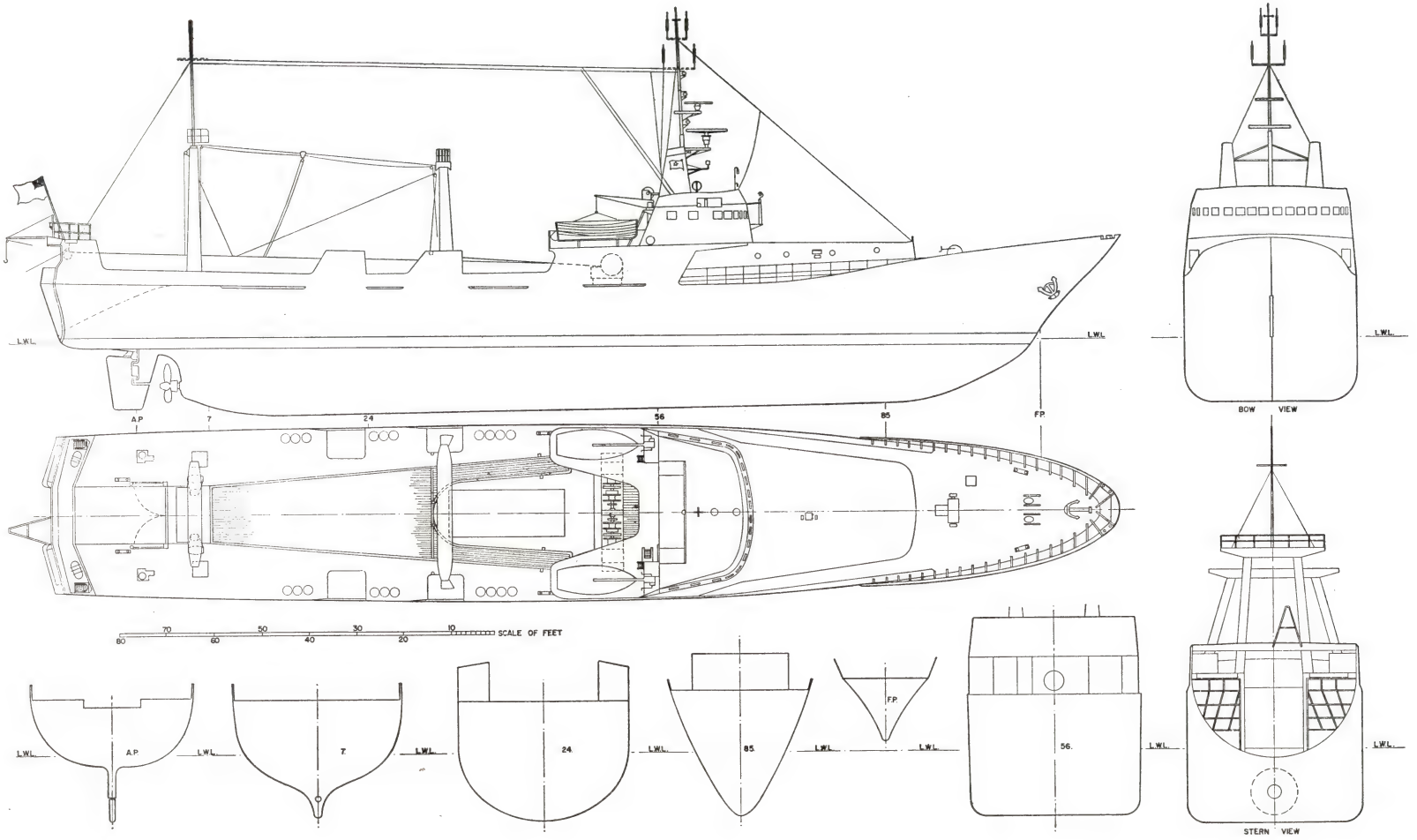
The model was tried out with reduced sail on quiet evenings, gradually adding more sail as my confidence rose. Initially the false keel area was symmetrical about the centre of buoyancy, but in this state there was very marked luffing, and only the topsail could be used on the mainmast if the model was to keep sailing. Gradually the forward end of the false keel was cut back about four inches until more sail could be carried. There is still some luffing in stronger winds, and when I find some reasonable water local to Bristol I intend to move the false keel area even further aft.

The model was very stable, and in fact was somewhat too stiff, so that in stronger winds, she would drive until the bow wave nearly buried the figurehead unless I reduced sail. Since then, the lead has been moved upwards on the keel which I hope will improve matters.

At the Thames Shiplovers' Rally on the Round Pond last May, the wind gusted to 20 knots at times. The *Wild Swan* under suitably reduced canvas behaved quite well, and I had no qualms over seeing her heading for the widest part. The model did, however, display a most aggressive tendency, and apparently would deliberately alter course so as to ram any other model within ten yards. After several such encounters including one where she was dragged right across the lake by a model Thames barge, she showed signs of wear with broken martingale and main royal masts. These have since been replaced by painted dural knitting needles.

(*Continued on page 83*)

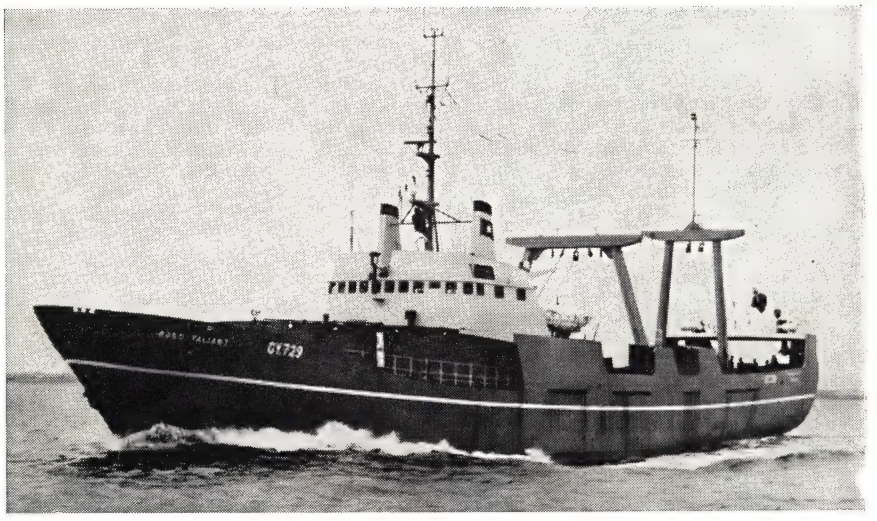

'V' CLASS DESTROYER 1943
LENGTH O.A. 362'-9" BEAM 35'-8" SPEED 36 KNOTS
HARDY R08
VALENTINE R17
VENUS R50
VERULAM R28
VIGILANT R93
VIRAGO R75
VIXEN R64
VOLAGE R41
DISPLACEMENT 1,710 TONS EXCEPT THE LEADER 'HARDY' 1,730 TONS.
Marine Miniatures P.A.SWEET
0 FEET 50 100
HULL & SUPERSTRUCTURE - LIGHT & DARK GREY CAMOUFLAGE SCHEME
DECKS - DARK GREY & DARK GREEN
WATERLINE - BLACK
RANGE FINDER
DIRECTOR TOWER
LATTICE MAST
4-2 PDR. GUNS
TORPEDO DAVIT
LATTICE MAST
4-7" GUNS
A
B
C
D
E
F
DEPTH CHARGE THROWERS AND DEPTH CHARGE STOWAGES
DECK - DARK GREEN
SEARCH LIGHT
WHALER
DECK - DARK GREEN
WATERLINE
BLAST SHIELD
PROPELLER GUARD
4-21" TORPEDO TUBES
20 MM A/A GUN
MOTOR BOAT
4-7" GUNS
BREAKWATER
HULL SECTIONS
A
B
C
D
E
F
H.M.S. VERULAM 1945


L.W.L.
A.P
7
24
56
85
F.P
BOW VIEW
STERN VIEW
SCALE OF FEET
80 70 60 50 40 30 20 10
A.P
7
24
85
F.P
56

ROSS VALIANT

Diesel Electric Distant Water Stern Trawler

by
Commander R. Moore,
R.N.



Foreword

I HAVE chosen this remarkable ship for a number of reasons:

a) The length to beam ratio of 6.3 to 1 makes her suitable for a working model.
b) She is a very modern ship in every way.
c) As I served in the battleship *Valiant* for some years, the name means something to me.

The Ross Group

The Ross Group, who own the *Ross Valiant,* have a fleet of 60 ships based on the River Humber divided as follows:

36 Trawlers whose names start with "Ross", e.g. *Ross Renown, Ross Kestrel,* etc. (Ross Trawlers Ltd.), 11 managed by Charleson-Smith Trawlers Ltd., of Hull, whose names start with "Stella", *Stella Polaris, Stella Leonis,* etc., and 13 "Capes" *Cape Canaveral,* etc., managed by Hudson Brothers, Trawlers Ltd., of Hull.

Stella Leonis won the Silver Cod trophy in 1963 and 1964, her skipper, Roy Waller, bringing home 39.556 kits (49,445 cwt.) in 1963 with no less than 318 days at sea.

Fishing grounds

The old days when drifters and trawlers found their way by the colour of the North Sea water to the Dogger and Forties and then back, with (or without) the fish, seem to have gone. The Ross group range the North Atlantic and Arctic from Newfoundland to Greenland and Norway in search of fish and if you have watched the appalling weather in these seas from the comfort of a television chair you may have some idea, but not much, of what it is like. I know I couldn't stand it, and I have served in destroyers and small craft.

Equipment

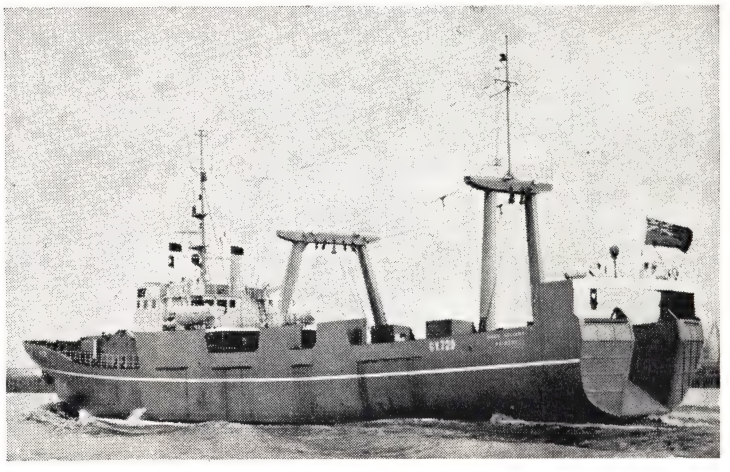
As regards the fishing equipment, the drawings and photographs are nearly self explanatory, the decks abaft the bridge being clear for handling heavy loads of fish.

The other equipment and fittings, which, however, are not shown, are very comprehensive and you may think, when you see what is provided, that all the skipper has to do is to drink rum and fill in his football pools while electronics do the rest.

Paradoxically, it is, of course, a fact that the more comprehensive the gadgets you have to help you, the more you must know of the basic principles, for instance, of navigation. So now to some details.

Hull

The hull has a marked sheer and the peculiar shape of the bow is necessary for ice breaking. There is a ramp aft in the square stern, which, together with the overhead gantries with their blocks and wires, handle heavy loads with the powerful winch situated just abaft the bridge. Freeing ports are cut in the bulwarks either side to release storm water.



Photos by courtesy Ross Group

Propulsion

Three diesel engines situated below the bridge, low down in the hull, each drive a D.C. generator and A.C. alternator, the D.C. generator providing current to two 825 B.H.P. water cooled motors situated well aft. The two motors gear into a single and central shaft on which is a four bladed propellor of 10 ft. 3 in. diameter. The propulsion switchboard is situated just forward of the general switchboards and diesel engines.

Other Electrics

In addition to the D.C. propulsion and switchboard, an alternator is coupled to each diesel engine shaft to supply the many ship services at 415/240 volts, with a shore connection box to allow off-shore supply at the standard 3 phase voltage of the grid system.

Deck Machinery

A Robertson electric trawl winch is located just abaft the bridge structure. This takes 1,500 fathoms of $3\frac{1}{8}$ in. wire rope on each of the two large drums and 150 fathoms of $2\frac{7}{8}$ F.W.R. on each of the two smaller drums. 300 h.p. is available for the winch. There is an electric cable winch on the forecastle, the ship having two bower anchors.

On each quarter is a reversible electric capstan for bobbin haulage. Steering gear is electric/hydraulic.

Auxiliary Machinery

There is a great deal of auxiliary machinery in connection with refrigeration, air compression, circulating water cooling, evaporating and distilling, etc.

Radio and Radar

The chart room and wireless office are placed one on either side of the wheelhouse, with the following equipment:

a) Communications.
Marconi Globespan Transmitter, 2 Marconi Atlanta receivers.
Marconi Kestrel Transmitter/Receiver. Cossor and Hudson R/T.

b) Navigation, etc.
A.E.I. Type 651 Radar (new). Kelvin-Hughes 14/9 Radar—both stabilised by the Sperry gyro. Decca Navigator automatic pilot. Redifon LORAN, Marconi Lodestar automatic D/F, Kelvin-Hughes log, 2 Simrad echometers and one ATLAS—LUPE C.R. tube for sealed display in connection with echometers. I can think of only one addition to help Navigation and that is a crystal ball—a device which I could never get the Admiralty to supply in the days when I navigated aircraft over the trackless wastes.

Statistics

Owners: The Ross Group.
Builders: Cochrane and Sons Ltd., Selby Yorkshire.
Description: Distant water stern trawler.
Lloyds classification: +100 A.1. stern trawler.
Cost: £450,000 approx.
Length overall: $226\frac{1}{2}$ feet; beam: $36\frac{1}{2}$ feet; moulded depth to upper deck: $24\frac{1}{2}$ feet.
Gross tonnage: 1,156 tons.
Fishroom capacity: 400 tons.
Port of registry and number: Grimsby GY729.
Other ships in class: *Cape Kennedy* and 8 others building.
House Flag: A white 5 pointed star on a grass green background.
Ship's colour scheme: Grey hull with white stripe around, and red boot topping. Name and Registration number on each bow (in white). Name, Port of Registry, and Registration number on each quarter. Masts and Main deck house, light brown. Bridge, white. Funnels, white with black tops, with houseflag painted on the white.

Acknowledgements

I should like to thank both the Ross group and Messrs. Cochrane, the builders, for their kind assistance with photos, plans and information.

Anyone requiring more technical information and pictures is strongly recommended to try and get "The Motorship" for September, 1964, and the Ross group supplement to Fishing News of September, 1964. The latter, in particular, is packed full of photos of various trawler classes, which would be of great value to model makers.

Stern Piece

Talking of fishing reminds me of smacks. Some years back the Admiralty gave advice to young officers of the watch and quartermasters on how to estimate the wind force for Beaufort scale notation in the ship's log. Notes such as "Force 4, Smacks under full sail. Force 7, Smacks shorten sail." Force 12? Smacks on the bottom. (Take him away.—*Ed.*)

Modellers who may wish to construct a working model of this attractive vessel can obtain a copy of the drawing on page 60 at $\frac{1}{8}$ in.—1 ft. scale (hull approximately 28 in. x $4\frac{1}{2}$ in.) price 5s. 6d. including post. Offer is for a limited time as the drawing is not a standard Plans Service product; apply to the editor.

A Face-Lift for an Old Lady

E. W. Gearey describes the conversion of an A Class yacht for R/C sailing in the Q Class

I HAVE been a confirmed R.C. power boater for about 12 years, having progressed from my first boat, a Veron Police Launch with electric power and sequence control with home made transmitter and single valve receiver, via a Wavemaster, Motor Patrol Boat, St. Laurie fibreglass and others with gradually advancing radio control systems, to my last, a Chris Craft Commander with Gannet engine and full controls via a 6 channel transmitter and reed receiver.

My fellow members of the London Radio Control Models Society were gradually being converted from power boats to R.C. yachts and in June, 1964, seeing them sail at the Rick Pond, with eight boats on the water at the same time and racing to slightly modified Yacht Racing Association Rules, convinced me that this was what I really wanted.

My power boat colleagues had been rather slow in adopting superheterodyne receivers and I had become a little tired of sailing all by myself in steering and speed events.

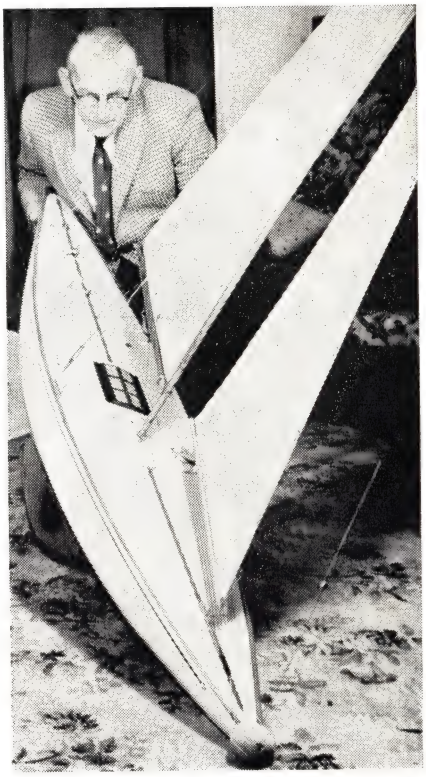
In July, 1964, I was fortunate enough to be offered a good "A" Class yacht at a reasonable price which I snapped up, loaded the boat on the car roof-rack and was off home to my garage-workshop to plan her conversion to radio control.

The yacht was *Arabesque,* registered A671, built in the early 1950's by Arthur Levison, of Farnham, to a design by A. W. Littlejohn, and she had had an extremely good sailing record, having won the "A" National Championship shortly after being built and had many more successes since then.

There being little of the 1964 sailing season remaining my immediate aim was to have *Arabesque* on the water as soon as possible in order to put both her and myself to the test of competitive sailing and, what would be even more useful and important, to pick up hints and tips from the owners of other yachts who I found were no less prepared than their power boat brethren to discuss with a newcomer to the hobby all matters pertaining to that hobby. On the basis of this experience and advice I would be in a far better position to plan the thorough final conversion at the end of the season.

I already had a superhet receiver which had been made for me by a colleague of the London R.C.M.S. and this I coupled to four of the relays from my old E.D. receiver in order to operate two control units—one for the sails and one for the rudder. A gear box, which I had built to operate a Kitchen Rudder on my Commander, was readily adapted to drive a winch for controlling the sails, and a smaller gear box was put to use to give progressive rudder control.

These units were rather rough and primitive but they worked satisfactorily on the bench and subsequent lengthy trials on my home water, the Moat at Elstead, showed that they worked equally well under varying sailing conditions.



The first regatta available following these trials was at Poole —*Arabesque* was duly entered and I found myself, a complete novice, sailing against some of the best boats in the country and also, may I add, being made very welcome, the brotherhood of R.C. yachtsmen being, I found, even stronger than that of power boaters and that is saying quite a lot.

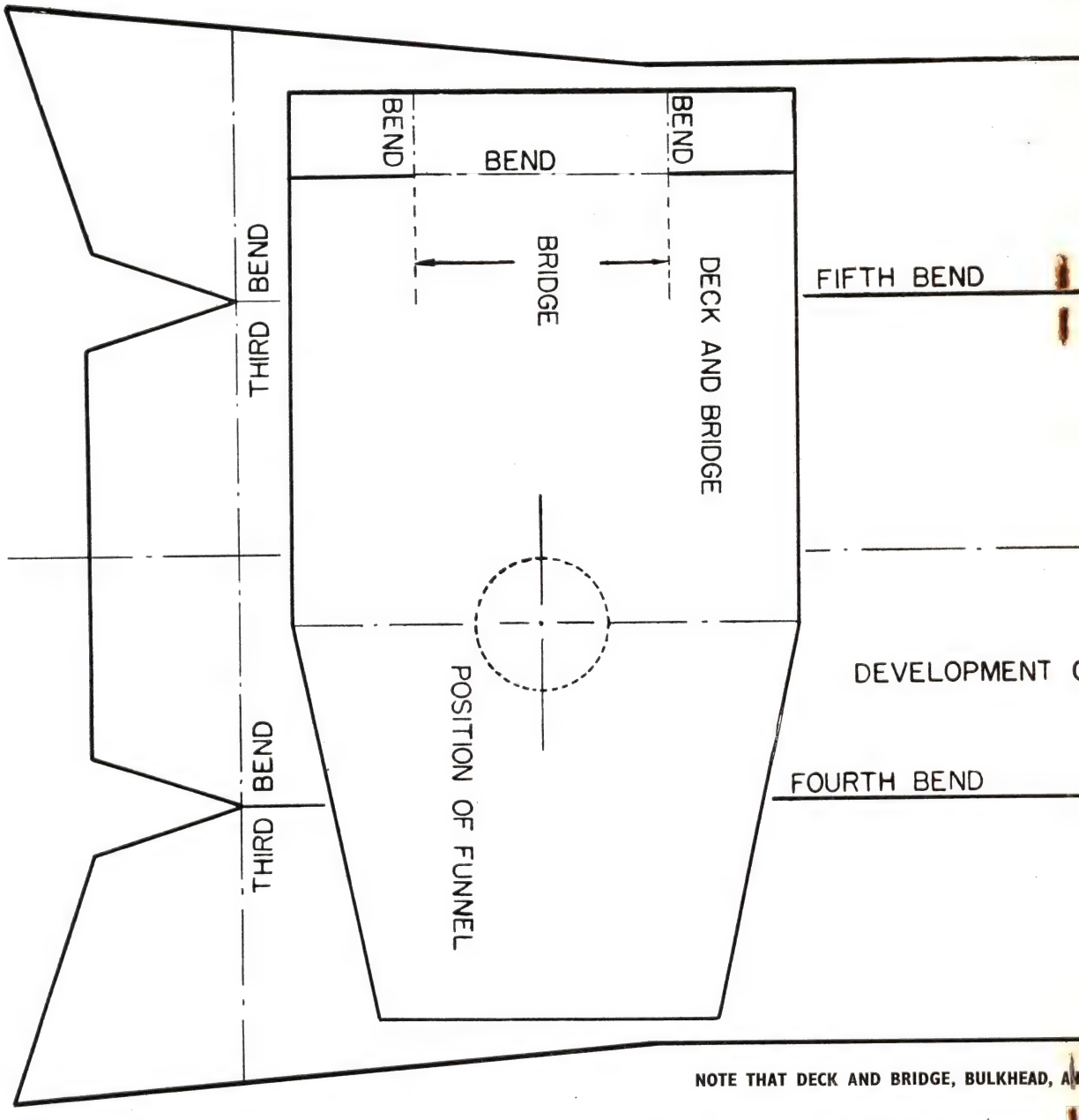
I was in for a very pleasant surprise, for *Arabesque* acquitted herself extremely well in the light winds of the first day and reasonably well on the second day with its high winds and rough water. What was even more surprising was the fact that, with no previous experience of sailing either model or full size yachts, I was managing to sail *Arabesque* reasonably well.

A further outing at Gosport regatta a few weeks later was not so successful, as one of the gears in the rudder control unit stripped on the first day and could not be repaired for the second day's sailing.

The experience gained and advice received at both these regattas and during many hours sailing at Elstead had provided the necessary information to enable me to plan the major refit to be carried out during the winter months.

The radio equipment had proved itself adequate and reliable and would only need tidying up and the addition of some means whereby crystal frequencies of both transmitter and receiver could be easily and rapidly switched to eliminate interference by or with any other yachts sailing with me at any one time.

The sail control unit had been found not to have sufficient power to pull the sails in under conditions of strong winds and the winch drum and guides would

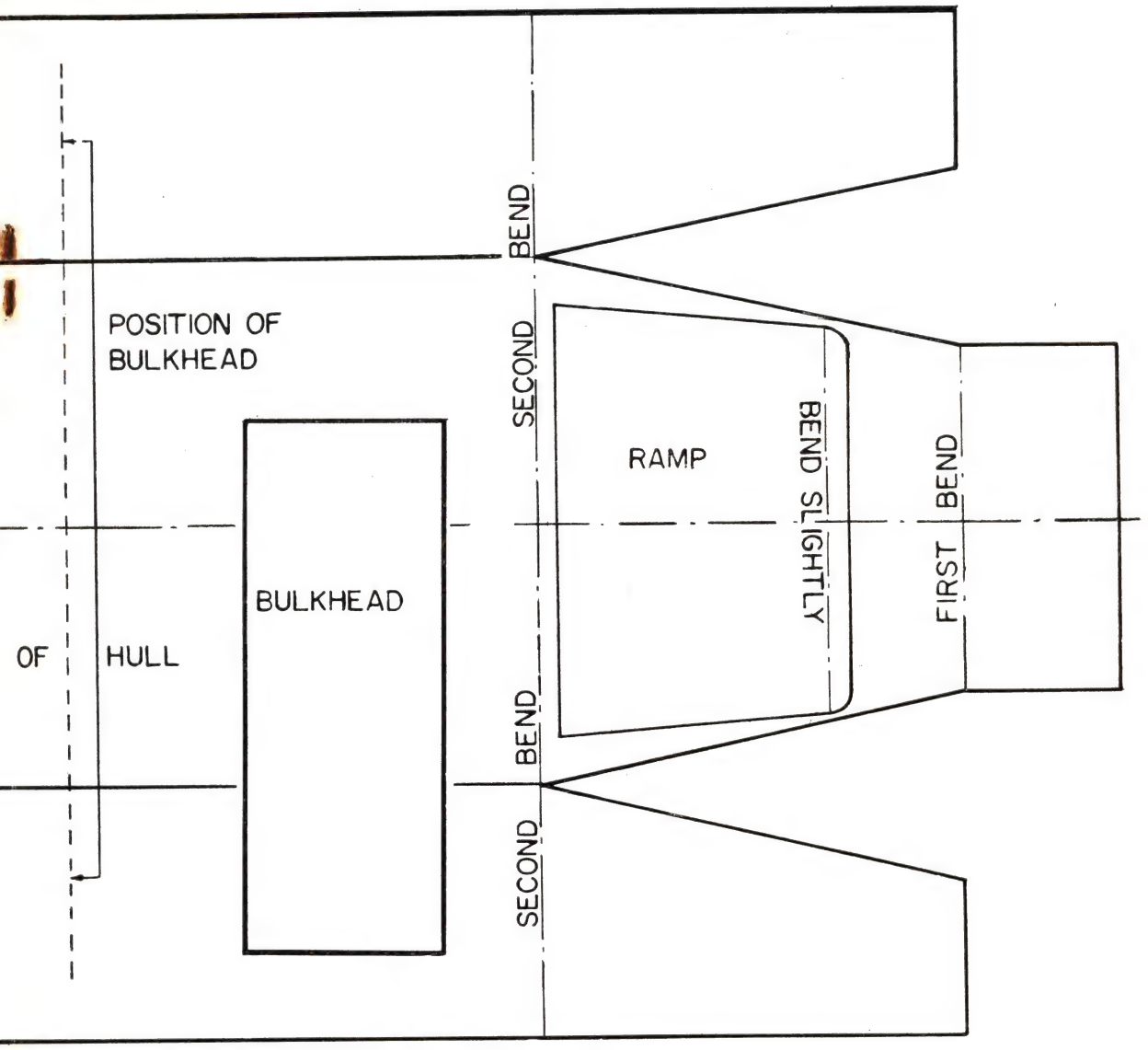


through which the bend is taken is obvious from the shape of the hull outline. The third bend is quite similar and is made at the forward end of the hull. Finally, the hull sides are folded into position and the hull should appear as in Fig. 2.

Solder is perhaps best applied from outside the hull. As far as schoolboys are concerned the hull should be fitted over a wooden former and held in place with soft iron wire for soldering. The bulkhead and the ramp (also cut from similar tinplate) may be fitted and soldered in position. Note the slight bend at the top edge of the ramp. It is not good sheet metal practice to have the raw edge of the tinplate exposed; a safe-edge or wired edge is preferable, but this may look rather heavy on such a small model. The edge may be dulled with file and emery.

Now is a good opportunity to fit the miniature electric motor. Note the position of battery and motor. These should be as close to the bulkhead as possible, for stability of the model, indeed the battery may be wedged lightly between motor and bulkhead. Drill holes in the floor of the hull to suit the motor and solder motor mounting bolts in place (they are inserted from the underside of the hull).

The stern tube assembly is quite small, and the tube is soldered to a suitable size of hole drilled in the hull. Do not use the prop tube to force this



AND RAMP ARE SUPERIMPOSED ON MAIN DRAWING SIMPLY TO SAVE SPACE—DO NOT CUT OUT OF MAIN HULL SHEET!

hole to the correct angle—use a similar diameter steel rod (or the shank of your drill). The rudder tube is soldered to the centre of the transom—a friction fit between rudder shaft and tube is desirable here.

Cut the deck, which incorporates a simple bridge, from tinplate, and bend as indicated in Fig. 2. The after end of the deck rests on two triangular gussets which are soldered to the hull, also shown in Fig. 2. Roll up a 2 in. x $\frac{3}{4}$ in. diameter funnel from tinplate round a length of $\frac{3}{4}$ in. diameter dowel, fabricate a mast from $\frac{1}{16}$ in. diameter brass wire and the model is complete. Painting is largely a matter of personal choice. Grey topsides with black waterline and brick red below can be quite attractive. The violent zig-zag camouflage may be used or the more sombre colours of a landing craft adapted as a civilian car-ferry.

Guns, guard-rails, searchlights, etc., can be fabricated from tube and wire and, together with Airfix military personnel, they make quite a realistic model, and may add ballast to the forward area of the hull.

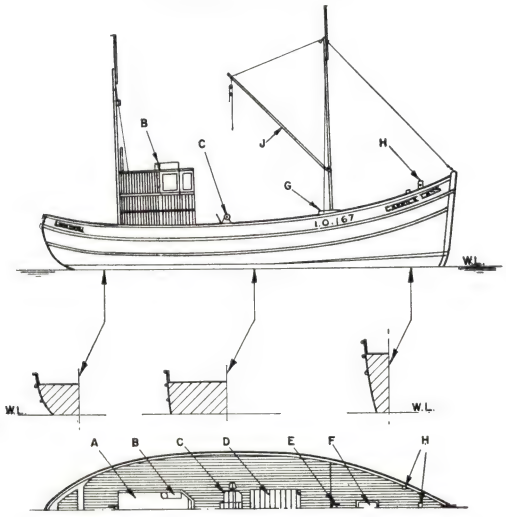
This little project can have a relatively high educational value in a technical school course; apart from the practical sheet metalwork, technical drawing is also incorporated in the form of developments, in fact the preliminary drawing of the model (elevation plan, etc.), together with the development may be carried out by the pupil before attempting construction of the model.

SMALL CRAFT No. 49

the traditional styled trawler 'CARRICK LASS' . . . .

by Arthur O. Pollard Jr.

all photographs by the author



TRAWLER
'CARRICK LASS'
DEPICTED 1965
L.O.A. = 50 FT.

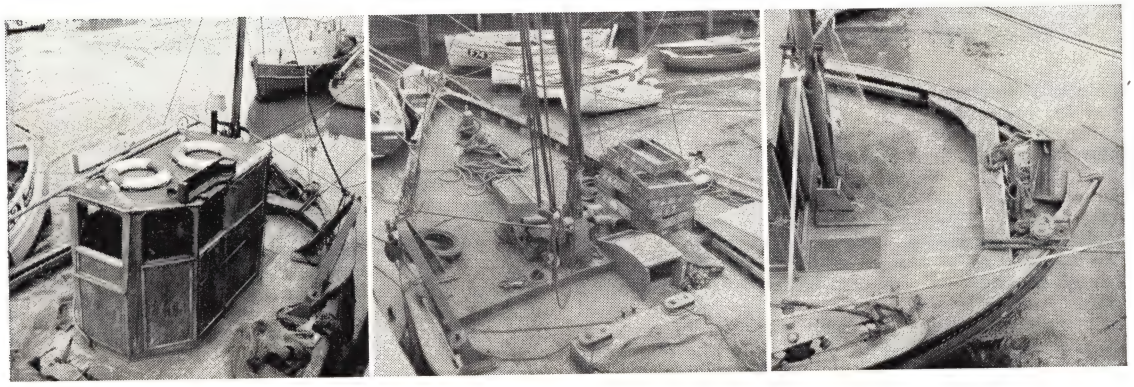
WE have in the past made reference to visits to Whitstable Harbour, in Kent, which has a great attraction for anyone interested in small craft boat types. The subject for a drawing at that time was a smart small fishing trawler of the more modern class design which had been built for a local fisherman by a Whitstable yard.

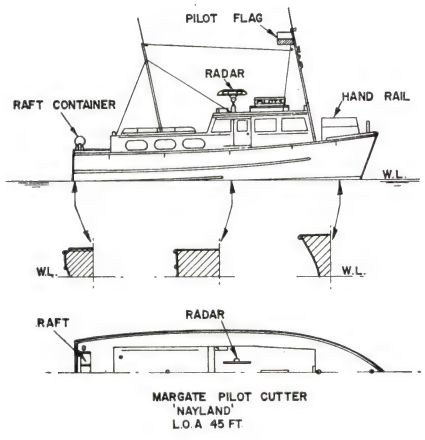
This harbour has been associated with the cultivation and marketing of oysters down through many hundreds of years, as was remarked upon the last time I wrote about the place in this series. At that time there were still signs of this industry working through its local boats, although the type of craft in use by owners gave indications of a change away from traditional (now motorised) oyster smacks.

On a visit made only a few weeks ago to Whitstable all signs of an oyster fleet appear to have gone. Of the four or five craft present in the harbour, of the oyster smack type, all but one had changed into private hands and were rebuilt as "pleasure" weekend cabin boats.

The one remaining vessel was spoken of as being destined for the same fate. There was another smack in the region, riding at anchor off the shore, mastless, as it had rolled-out, I was told, during a storm. She, too, was for disposal, which for practical purposes would seem to end the traditional fleet.

Connection with a sea industry, however, is being maintained by a number of off-shore trawlers which have found the harbour to be a convenient base for





Margate cutter "Nayland".

Also included this month is another drawing of a little service craft of the type which is of value to those seeking a "second model" for a larger show-case project scene, but which can be built as an individual item as part of a collection, if desired. The chosen vessel is *Nayland,* one of two cutters based on Margate for the conveyance of pilots to and from shipping off North Foreland.

Owned by the Thanet Motor Boat Company, the *Nayland* is a 14 knot launch constructed in Holland by Messrs. Schottel Ltd. and is propelled by one of their Schottel units through power by a Mercedes-Benz engine.

Nayland came into service in January of 1963, from which date she could be featured for show-case scenes out at sea, technically, of course, off the North Foreland region, or at Margate as a harbour project.

Something concerning the work of *Nayland* will interest those seeking background regarding the launch, for she acts as a pilot cutter together with another launch *Whiteness.* This latter craft is an ex-

. . *Plus* . . . Margate Cutter 'Nayland'

activities. Over the past couple of years, in particular, this small fleet has grown to around a dozen or so boats, some of which would make up into an attractive study for interested show-case scale model makers.

Chosen this time as our subject is an older traditional styled trawler which originated far from these Kentish waters. She was discovered practically as soon as we entered the gates of the harbour area and was prominent by being the only old trawler-styled craft present among a varied collection of small fishing vessels.

As could be seen by her name at her bows she was the *Carrick Lass,* which caused a suspicion that she was perhaps from Ireland. This was confirmed by her master-owner, Mr. Bill Dott, who informed us that she was purchased in 1963 from a port in Eire. She was then transferred to Erith, on the Thames, for a time, but had latterly become based at Whitstable for professional fishing. Basically unchanged in her structure, *Carrick Lass* is 50 ft. in length and powered by an 80 h.p. diesel.

Colours: Hull, red boot-topping, white waterline trim strake, varnished wood (carvel construction) sides, black toprails with white trim line, name and registration number "L O 167". Decks, red. Skylight, companionway and wheelhouse sides, varnished wood, with wheelhouse roof being red. Trawl winch, grey. Hatch, grey. Masts, oiled wood with white top parts.

Key to drawing: A) wheelhouse. B) navigation side light. C) trawl winch. D) hatch. E) mast and derrick. F) skylight. G) companionway, see photo illustration, starboard side only. H) bitts. I) derrick.

R.A.F. air-sea rescue boat. The Margate cutters, licensed by Trinity House, but privately owned, operate for the convenience of both the pilots involved and the shipping companies. For if the pilots cannot be put on board or taken off at North Foreland, as occurs during times of bad weather, the pilots have to be handled by Trinity House vessels at the Sunk Lightship region or "over-carried" to ports such as Continental Rotterdam or Antwerp.

Other shipping routes served by *Nayland* and her companion cutter include those to Amsterdam, Dunkirk and Dieppe. During the course of a typical month, according to weather conditions, something in the region of 200 ships are served by these cutters.

Both cutters are fully equipped with Decca radar, V.H.F. radio and r/t links. *Nayland* has a crew of two and can carry up to 12 pilots on board.

Nayland colours: Hull, black with a light blue streak at the waterline. Decks, light green anti-slip. Superstructure and masts, white. "Pilots" sign, white letters on a black base. Radar, grey. Flag is of metal and red and white (pilot's signal).

About Propellers

M. Duggan covers some helpful points on a tricky subject

EVERY power boat modeller knows the uncertainty involved in choosing an engine and propeller to drive a model boat. This article is intended to remove that uncertainty and give the modeller the basic know how, so that he can decide, with confidence, which is the best power unit for his boat. In order to accomplish this task we will start by showing just how the propeller works, and then carry on to explain how propellers and engines should be matched, and finally give some interesting information on certain boat propulsion techniques.

To understand how a propeller works one must realise that any fluid can only be made to flow by applying a pressure difference to it, and this is just what a propeller does. The rotating blades create zones of high pressure in front of them and low pressure behind them. Due to the shape of the blades —the angled attitude relative to the shaft—and because of the direction of rotation, these pressure differences induce water to flow through the plane of the propeller. Figure 1 shows how this happens, by taking a look down one of the propeller blades.

The velocity of the flow of water through the propeller—let us call it 'V'—depends on the rotational speed, the pitch (see March 1965 issue of Model Maker for a full explanation of propeller pitch) and the blade area of the propeller. Increasing any of these will increase 'V' and vice versa. The diameter of the propeller governs the total volume (mass) of water moved by the propeller and does not DIRECTLY influence 'V'.

The induced pressure difference across the blades of the propeller produces a resultant force on each blade. This force acts at right angles to the surface of the blade and can be resolved into two components, one acting tangentially to the plane of rotation of the blade, and the other acting axially—see Fig. 2. In a boat the tangential component has to be balanced by the torque of the engine, and the axial component has to overcome the drag and wave-making resistance of the boat. Since the drag and wave resistance of a boat depend on its speed, it is obvious that 'V' must always be greater than the forward speed of the boat—'U', say— for the propeller thrust to overcome them. In a moment when we come to consider the more practical side of propellers we must realise that this—depicted in Fig. 3 —is most important if we are to understand the function of a propeller.

On Propellers, Engines and Boats

From the above information we can see that the speed of a boat may differ greatly from the speed given by the product of the pitch and rotational speed of the boat's propeller (see M.M. March, 1965) and the difference depends on the blade area of the propeller, its diameter, and on the relative size and configuration of the boat. If the blade area and diameter are small and the boat is very large, then the difference between 'S' and 'U' will be very large and vice versa (where 'S' is equal to pitch x rotational speed of propeller). So it is no simple matter to arrive at a boat speed given a certain propeller; 'U' may be anything between 10 per cent and 80 per cent of 'S'. Obviously it is better to tackle this problem from another angle if possible. If we realise that a propeller is merely an instrument for converting engine power into boat movement, it becomes possible. We can see that the speed of a boat depends only on the power of the engine, provided that the propeller is chosen so that it acts efficiently in doing its job of conversion. In practice this is surprisingly easy—as long as you're not a "speed record" enthusiast, where every little bit counts. The propeller has to be chosen so that it allows the engine to run at its best speed. If the engine is electric this speed will be somewhere between 1000 and 6000 r.p.m. if it is a diesel engine the speed will be in the 7000 to 12000 r.p.m. range depending on the particular engine. Providing the engine is running at its design speed (when propelling the boat) the propeller should automatically be doing its job. For most purposes it is by no means essential for the engine's design speed to be achieved. Electric motors can be run slower and thus give more power—as long as they don't run too slow and start to heat up too much— and of course diesel engines are quite happy to run within a few thousand r.p.m. of their engine speed.

The beginning of this article mentioned the factors on which propeller performance rested, namely pitch, blade area, diameter and rotational speed. We have decided that the rotational speed has to be fixed according to the engine—this operating speed of an engine, whether diesel, electric, petrol or steam, is usually stated by the manufacturers—and this requires that the other factors should be altered until the engine is able to rotate the propeller at this speed. Which of the other factors is altered does not really matter as far as the engine is concerned, but usually there are other things to be considered, such as the type of model and the maximum diameter of propeller the model can accommodate. Generally speaking, electrics work best with medium diameter propellers having a fairly small pitch and large blade area (that is the normal type of nylon propeller which is widely available). Diesel engines, however, seem to prefer large pitch propellers with small blade areas (two bladed metal props). Different people have different ideas on this matter, and really all that counts is personal experience. However, it is widely accepted in the full size ship world that large blade area is essential for low speed engines, and this could well be applied to electric and steam installations in the bigger, heavier models. The finer points of this sort are really beyond the scope of this article, and the interested modeller should read some of the many helpful books available on the subject if he wishes to delve further. The table accompanying this article shows suitable propeller parameters for a number of electric motors, and includes a power consumption figure for the motors so that un-nominated motors of equivalent power may be suitably matched. If this table is used as a guide, the modeller should soon become proficient at propeller matching. For diesel enthusiasts there is a similar table in the book "Boat Modelling" by Vic Smeed which, when con-

sulted in conjunction with diesel engine specifications, will give sufficient information for efficient matching.

If modellers wish to test that their engines are running at the right speed, some sort of revolution counter or speed indicator will be required, of course. However, with electric motors the current consumption can be used to indicate speed. Usually manufacturers quote the current consumption at the maximum power and maximum speeds, so that if the current consumption is between these values one can be sure that the motor will be running at a satisfactory speed. Small changes in speed can be achieved by careful alteration of the propeller pitch—if it is metal, of course—or blade area (or diameter). Increasing the pitch (with a pair of padded pliers) will reduce the speed; and decreasing blade area (using a file and glass-paper) will increase speed, and vice versa. Care must be taken to ensure that after such "doctoring" the pitch and area of each individual blade of the propeller are the same, otherwise unbalanced forces will exist when the propeller is working which will ruin bearings.

The next topic for consideration is the effect of the type of boat hull on the power required to propel it. This will then clear up the engine to boat matching, and picture will be complete. The table shows suitable hull lengths for the various electric motors, and suitable hull lengths for diesel engines can be found quite easily from most advertisements. Diesel engines are usually only used for fast hulls—cabin cruisers, launches, hydroplanes etc. and the hull lengths quoted are quite straightforward. For electric motors—which can be used for either fast or slow hull types—the situation is more complicated because of the limited power available and the weight involved. Where fast hulls are concerned, if the engine used is powerful enough to make the hull plane, then everything is alright. If, however, the engine is not powerful enough for planing— as is usually the case with an electric motor—then the resistance of such a hull to motion can be greater than a slow type hull, e.g. liner, cargo ship, warship etc. of the same length. So for the range of hull lengths quoted for electric motors it is best, in order to avoid overloading the motor, that the lower lengths be taken as referring to fast hulls, and the higher lengths to slow hulls. Strictly speaking, electric motors are quite unsuitable for fast hulls unless the motor is very powerful and is run from high efficiency, low weight accumulators.

Other forms of propulsion, like steam, clockwork and petrol engines, can be adopted quite satisfactorily for either type of hull, providing the total power output to the size of the hull is correct.

Propulsion Systems

Occasionally, due to a particular design of hull or because of the extreme size of a model, the maximum diameter of propeller which will fit on the model is not large enough to absorb all the power of the engine. In such a case the only answer is to use more than one propeller—to have a multi-prop system. This situation is to be avoided, if possible, because of the extra friction losses in the bearings (and gears if one motor is used) and because a large diameter propeller is more efficient than two or three smaller ones. However, in those cases where it is essential, there are a few factors, in addition to the above information, which influence the matter. First of all, use the smallest number of propellers possible. This keeps friction losses to a minimum and is more efficient from the propeller size point of view. Secondly, try to avoid the use of gears (this applies to any situation) and use one motor for each shaft. If the hull is very narrow and the use of separate motors would require unduly long shafts, then it might be better to use a single motor geared to each shaft; reduction gearing may then be used to advantage. Lastly, a multi-prop system necessitates extra protuberances beneath the hull—shaft supports and probably an extra rudder—and this may be detrimental to the boat's performance. An extra effort should therefore be made to achieve good streamlining around these points. (*Continued on page 73*).

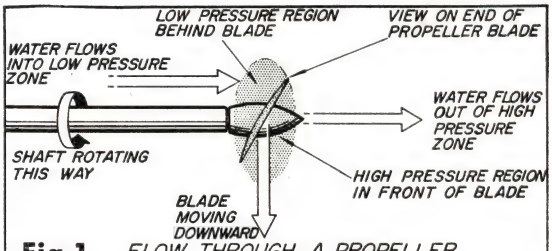

LOW PRESSURE REGION BEHIND BLADE
VIEW ON END OF PROPELLER BLADE
WATER FLOWS INTO LOW PRESSURE ZONE
WATER FLOWS OUT OF HIGH PRESSURE ZONE
SHAFT ROTATING THIS WAY
HIGH PRESSURE REGION IN FRONT OF BLADE
BLADE MOVING DOWNWARD

Fig.1 *FLOW THROUGH A PROPELLER*

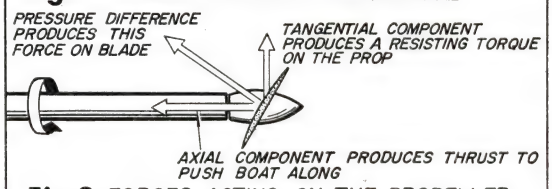

PRESSURE DIFFERENCE PRODUCES THIS FORCE ON BLADE
TANGENTIAL COMPONENT PRODUCES A RESISTING TORQUE ON THE PROP
AXIAL COMPONENT PRODUCES THRUST TO PUSH BOAT ALONG

Fig.2 *FORCES ACTING ON THE PROPELLER*

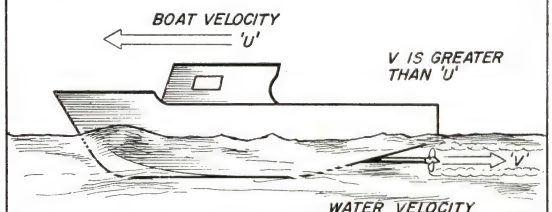


Fig.3 *A BOAT IN MOTION*

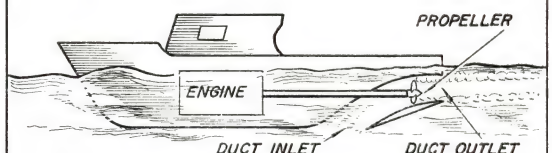


Fig.4 *INBOARD DUCTED PROPELLER*

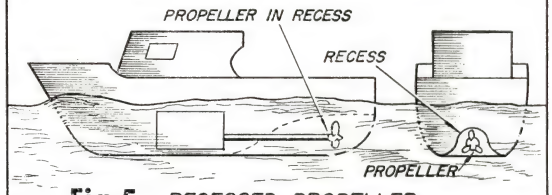
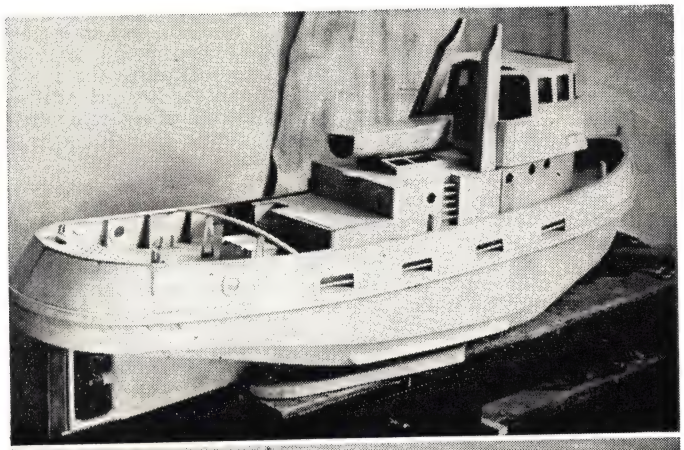
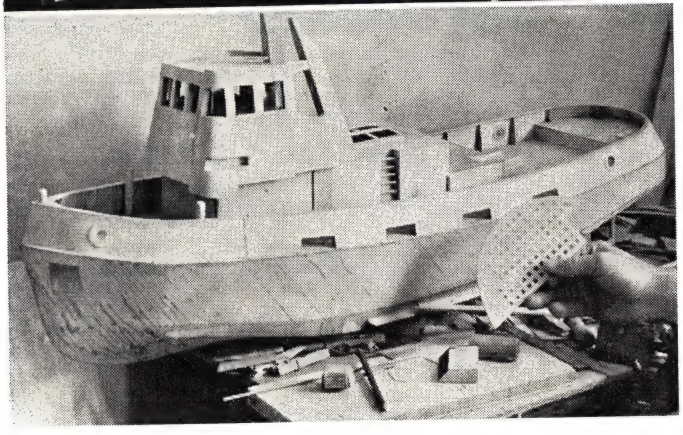


Fig.5 *RECESSED PROPELLER*



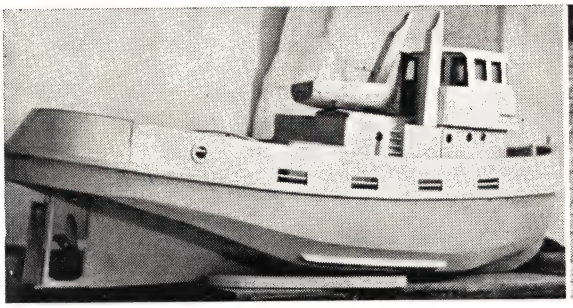


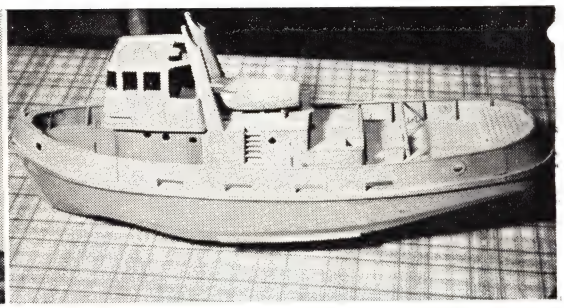
KINGSTON BUCI

A model of a local prototype by E. Bunker

This unusual model, a double chine tug, is built throughout of ply, with the exception of the superstructure framing which is obeche strip. The Shoreham-based tug is local to the modeller, at Southwick, Sussex, and the model is therefore very faithful in respect of detail etc.

Length overall is 37 in. and beam 9½ in., with a displacement of approximately 25 lb. The hull is double-diagonal planked in 1/16 in. ply or ¼ in. ply frames. Power is the Monoperm with Richard gearbox, supply being two lantern batteries





in series, giving 12v. With 6:1 reduction and a four-blade 2¾ in. dia. propeller, speed is realistic.

Mr. Bunker does not give details of his methods with small items, e.g. that very nice stern grating, but some information can be gleaned by a close study of the photographs. Certainly the model is most attractive and realistic afloat.

PROPELLERS (*Continued from page 71*)

If one has a multi-prop system (with separate engines) it is inadvisable to operate on one propeller for half speed cruising, since this may overload the one engine. Indeed, if electric motors are used the one engine may slow down so much so that its power output increases (a characteristic of electric motors) and nearly matches the total power when both engines are operating. This has the effect of producing little reduction in actual boat speed, and eventually burns out the motor.

An alternative method of using high power engines with one propeller—instead of employing a multi-prop system—is to use a ducted propeller system. Simply, this involves enclosing the propeller in a tube which will just clear its diameter, and building the tube inside the boat hull. An inlet to the tube is then taken from the bottom of the hull and the outlet is made in the stern of the boat just below the water line. For a high power engine the propeller should be a single bladed complete helix propeller. This type of propeller gives an axial velocity 'V' very nearly equal to its theoretical screw velocity 'S'. This is more efficient and can cope better with a high power engine. (It is not advisable to use such a propeller without a tube because in such a case it would have large losses due to a radial 'scatter' of water.)

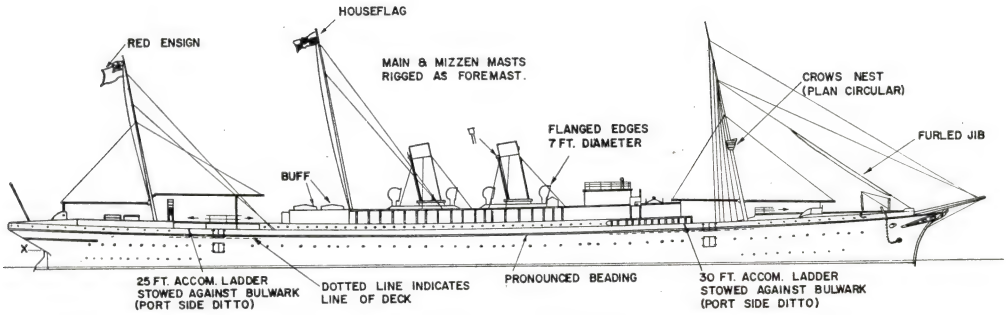
There is an additional advantage of a ducted propeller system which applies to all types of boat hulls and propellers. It is that additional thrust is obtained if the duct is taken through a right angle within the boat hull—see Fig. 4. The additional thrust is obtained from the resultant change of momentum of the water passing through the tube—the thrust from the pressure difference across the propeller being unaffected.

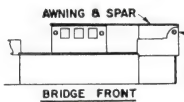
If such a duct is used due attention must be paid to streamlining the intake because too sharp a radius on the inlet edges will cause turbulence and a resultant loss of energy.

The idea of a ducted system is used, in a modified form, in some life-boat hull designs and one or two other round bilge hull type craft. This modified form is shown in figure 5. The duct is not taken completely inboard, but is present as a recess in the hull. The water has to flow upwards before entering the propeller plane, and thus has to change its direction as in the duct. This "recessed propeller" does not act as efficiently as a completely ducted one might, but the system has the advantage of a lower "duct" surface area and thus lower friction losses. In the case of life-boats, the recessed propeller also facilitates 'runway' launching, of course.

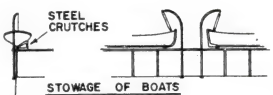
Ducted propellers are sometimes used in high speed craft with a convergent tube aft of the propeller. This can give a very high speed exhaust water jet. This means that 'V' can be higher than the 'S' value of the propeller, which increases the possible speed

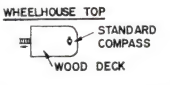
(*Continued on page 85*)

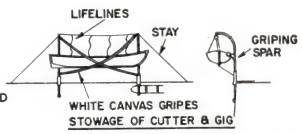

HOUSEFLAG
RED ENSIGN
MAIN & MIZZEN MASTS RIGGED AS FOREMAST.
CROWS NEST (PLAN CIRCULAR)
FLANGED EDGES 7 FT. DIAMETER
FURLED JIB
BUFF
25 FT. ACCOM. LADDER STOWED AGAINST BULWARK (PORT SIDE DITTO)
DOTTED LINE INDICATES LINE OF DECK
PRONOUNCED BEADING
30 FT. ACCOM. LADDER STOWED AGAINST BULWARK (PORT SIDE DITTO)

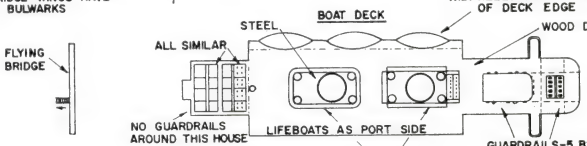


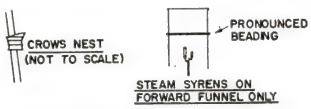
NOTE: ONLY BRIDGE WINGS HAVE PLATED BULWARKS

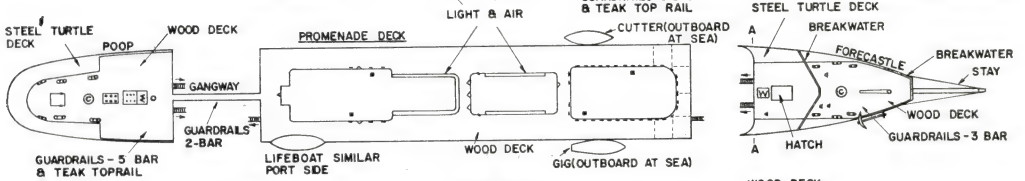


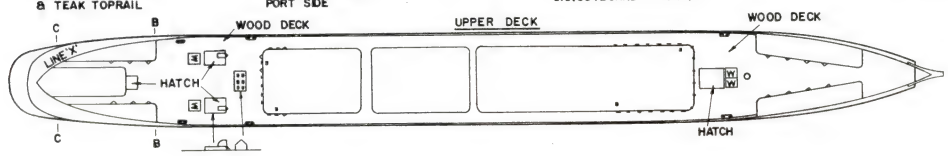


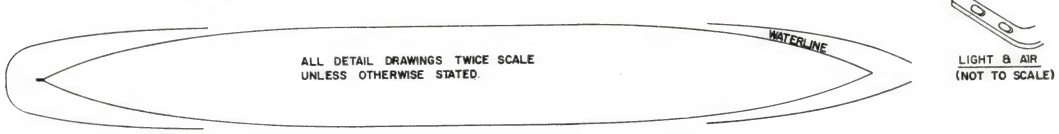


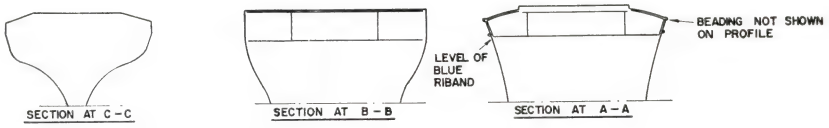












S.S. EMPRESS OF INDIA CANADIAN PACIFIC
PASSENGER LINER. VANCOUVER – HONG KONG. L.O.A. 485 FT. (EXCLUDING BOWSPRIT). BEAM ON WATERLINE – 51 FT.
GROSS TONNAGE – 5,905 16 KNOTS SERVICE SPEED BEAM AT PROMENADE DECK 48 FT.

SHIP IS SHOWN AT A LATER STAGE OF SERVICE WHEN SHE HAD BEEN REDUCED TO 3 BARE POLE MASTS.

HULL – WHITE WITH NARROW BLUE RIBAND IMMEDIATELY BELOW BEADING SHOWN ON PROFILE. BOOT TOPPING – GREEN
HULL ABOVE LEVEL OF UPPER DECK BULWARKS – BUFF
STEEL TURTLE DECKS & BEAKWATERS ON FORECASTLE – BUFF ANCHORS & CHAINS – WHITE
HOUSES ON UPPER DECKS, BULWARKS, HOUSES UNDER POOP & FORECASTLE – BUFF HATCHES – BUFF, GREY TOPS.
HOUSES ON PROMENADE DECK & ABOVE – WHITE LIFEBOATS – MAHOGANY
FUNNEL, MASTS & DERRICKS – BUFF VENTS ON BOATDECK, CASINGS – BUFF DAVITS – WHITE
VENTS ON FORECASTLE – WHITE STEAM WINCHES – BLACK SKYLIGHTS – TEAK SYRENS – POLISHED BRASS
(7 FT. HIGH. 1 FT. DIAMETER)

FIGUREHEAD – QUEEN VICTORIA. WEARING CORONET ON DARK HAIR.
WHITE GOWN WITH ORDER (PROBABLY GARTER) FROM RIGHT SHOULDER.
LEFT ARM CROSSED. RIGHT ARM AT SIDE. SCROLL WORK
(GOLD) ENCLOSED BY PRONOUNCED BEADING.

- PORTHOLE
- WINDOW
- W STANDARD STEAM WINCH
- VENTILATOR
- LADDER
- DOWN
- BOLLARD
- FAIRLEAD
- DOOR
- -.-.- INBOARD GUADRAILS
- ---- WOOD AWING STANCHIONS OR IRON STANCHIONS

HISTORIC LINERS No. 40

Empress of India

By R. Carpenter

THE *Empress of India* and her sister ships the *Empresses of Japan* and *China* were the first vessels built specifically for the trans-Pacific service of the Canadian Pacific Line. All three entered service in 1891 and provided standards of comfort and reliability of service which were a great advance on anything previously known. Nevertheless, in comparison with passenger liners running on many longer established routes, they were small, and they were some of the last, if not the last, ships of their type to be built with clipper stems and bowsprits.

The *Empress of India* helped maintain the service until 1914 when she came under Indian ownership and was used as a hospital ship. She remained under the Indian flag until 1923 when she was sold for scrap. The *Empress of China* was wrecked in 1911 and the *Empress of Japan* was the only one of the trio remaining in service in 1919. She was, however, outclassed by larger and faster ships which had been built or acquired and was taken out of service in 1922.

The last ship to be built for this service, which ceased after 1945, was the second *Empress of Japan*. Built in 1930 she was a smaller and earlier version of the famous *Empress of Britain* and she is still in service, although almost completely rebuilt, as the *Hanseatic* of the Hamburg-Atlantic line.

Acknowledgement is made to the Canadian Pacific Line for assistance given in compiling this article.

HI-LO STEERING

Adjustable rudder throw is used by Johannesburg model shop proprietor, J. P. Immelman, B.Sc. (Mech.) Eng.

Top picture shows large rudder throw for slow speed, bottom vice versa

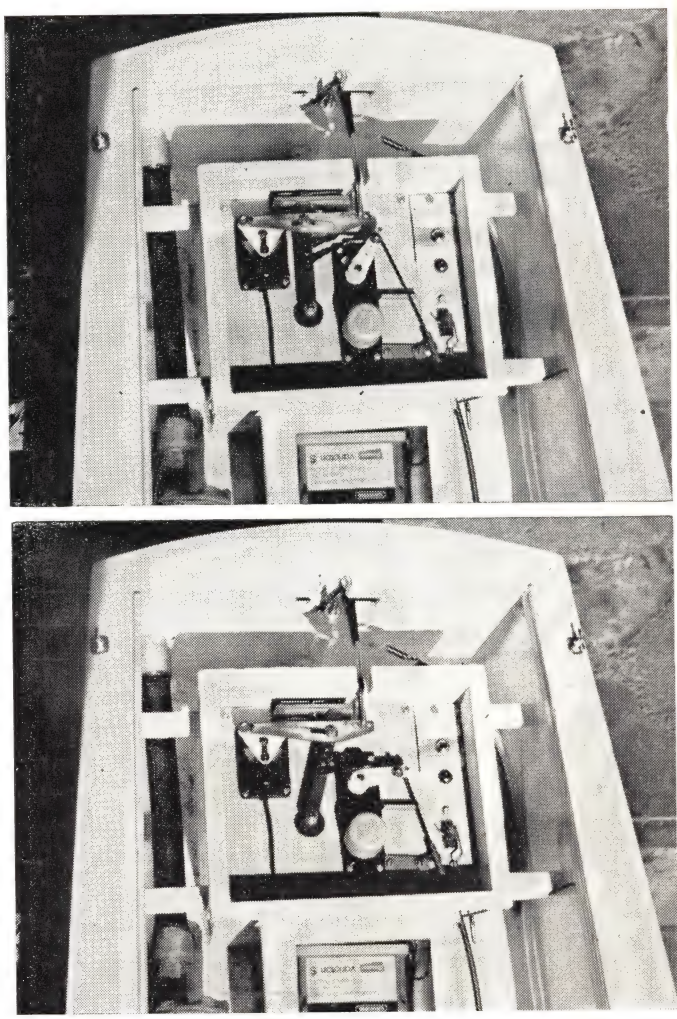
THE well-known Veron "Huntsman" kit is designed for 8cc. max. power, so when I installed the 15 cc. Taplin Twin it was evident that a very limited rudder movement would be advised at top speeds. At the same time, I wanted a quick-turning boat at slower speeds for steering competitions, so that the following design, applicable to any self-centring steering servo, was evolved.

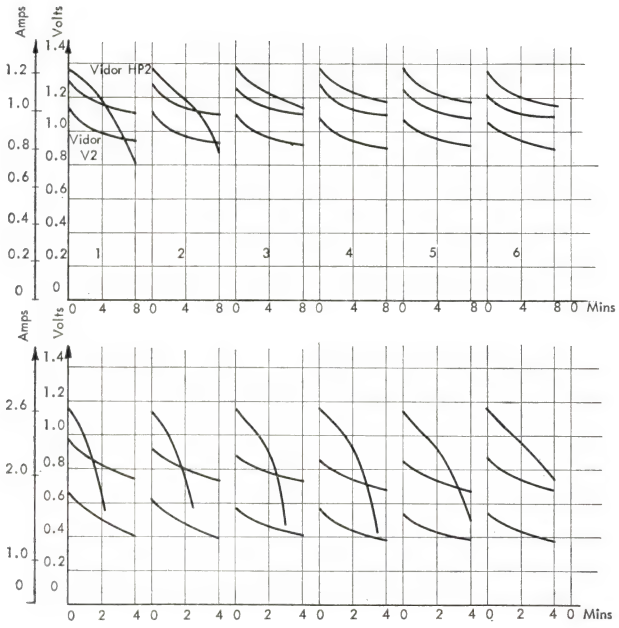
The photos show the linkage design for small rudder movement at high throttle and large movement at low throttle. This particular layout is designed around standard "Graupner" servos and gives the little Bellamatic plenty of leverage for rudder control at full throttle. As the Servo-automatic moves towards "slow" the sliding fulcrum point on the steering bar has no effect on the straight ahead position but gives progressively more available rudder throw.

Anyone who has seen a well-pulsed Bellamatic will know that this is an ideal servo for smooth yet self-centring control. The slow return enables one to "tickle" the rudder to intermediate positions normally associated only with proportional control, yet a touch of "opposite" centres it immediately.

The "HI-LO" linkage (I'm open to suggestions for a better name!) also implies that with simultaneous control . . . a great advantage for fast boats . . . the hard-over rudder position can be varied with throttle control. Normally, with full rudder set for safe full-throttle turns, an over-wide turn around a buoy cannot be corrected. With "HI-LO" you can still shave the buoy by reducing throttle while holding rudder . . . well, almost. I'm still practising!

For best results, of course, the throw of the fulcrum arm should be adjusted for maximum safe rudder at your high and low speeds, in my case 16 and 3 m.p.h. respectively. "Speed" or "Steering", here we come!

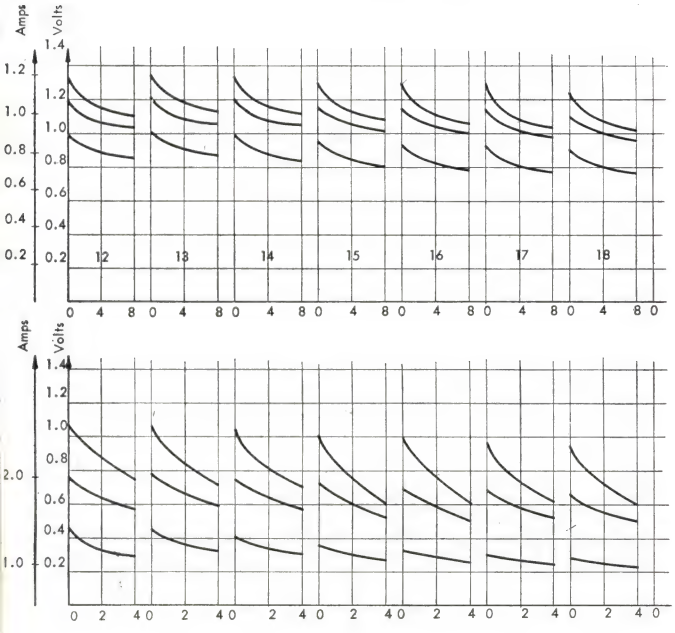




DRY BATTERY TESTS

Philip Connolly tests the new "high power" cells and finds some interesting results.

Graphs at top of column, numbered 1 to 6, are the first half-dozen discharges at low rate. Third block of graphs are the last six tests at the same rate, i.e. block 3 follows block 1, and block 4 follows block 2. In both cases the six intermediate discharges produced curves so similar that there is little point in reproducing them.



BY far the most common source of power for the average boat model is the dry battery. This can be used to drive any of a large number of electric motors available for model use at the moment. The main advantage held by dry cells over accumulators is their initial cheapness. However, there is a serious restriction in the power available from dry batteries for a given weight, and thus for a good performance, rechargeable accumulators have always been preferred Figures for the maximum power available from "Bell" and "Lantern" type batteries were given in *Model Maker,* May 1964.

Ever-Ready have, for some time, had "high power" versions of some of their range on the market. Recently Vidor have followed suit, and we decided to make some comparative tests between the two types, and a standard cell. The largest of the "high power" cells at the moment is the U2 or V2 size. Both manufacturers produce the new cell with the code number HP2, and this size was chosen as the basis for tests, since it is the most likely to be used in boats.

At 4 ozs, the Vidor HP2 cell is $\frac{7}{8}$ oz. heavier than the Ever-Ready HP2 and the Vidor V2. Part, but not all, of this is due to the leakproof case around the Vidor HP2. Physical sizes are virtually the same for each cell, as they are intended to fit the same instruments or equipment.

Tests were carried out with two different resistive loads, giving approximately 1 and 2 amp discharge rates. One of each type of cell was tried with each load, and a graph of voltage against time drawn for periods of four and eight minutes according to the discharge rate. After this period the cells were allowed a 24 hour recovery period, and were then again tested. The approximate values of current corresponding to various voltages are given. The lower amps scale is not linear because a bulb was used as a load and this does not have a constant resistance.

Conclusion from Tests

The Vidor HP2 cells at all times gave an initial voltage greater than the Ever-Ready HP2, which in turn was better than the Vidor V2. However, during the first discharges the Vidor HP2 soon dropped to below the Ever-Ready HP2 and even the Vidor V2 voltage. This came as a surprise, but even more so was the way that the Vidor HP2 improved with discharges. Thus from the graphs it can be seen that at the heavier current, it lasted $1\frac{3}{4}$ mins. before falling to 0.8 volts during the first discharge, whereas it lasted twice as long during the fifth discharge. This effect is also noticeable at the lower current. The Ever-Ready HP2 and Vidor V2 both gave smoothly falling characteristics, and successive discharges started at lower voltages.

Tests were discontinued after 18 discharges. At this time, the discharge curves were appreciably lower than to start with, for both low and high currents. The total watt-hour capacity taken from the cells was then as follows:- (watt-hours = voltage x current x time).

Vidor HP2	— 2.9 watt-hours	
Ever-Ready HP2	— 2.0 watt-hours	Low rate
Vidor V2	— 1.8 watt-hours	
Vidor HP2	— 2.4 watt-hours	
Ever-Ready	— 1.7 watt-hours	High rate
Vidor V2	— 0.7 watt-hours	

Continued at foot of opposite page

MODEL POWER BOATING

Mike Varley, Secretary of Keighley D.M.E.S. and prominent in Yorkshire power boat circles, looks at the present-day scene and analyses trends, with a few sound suggestions as well.

Modellers and Boats. These fall basically into one of the following categories:

Hydroplanes. These modellers are generally not interested in any other type of boat and they are people capable of making their own engines or considerably modifying commercial units. Usually blessed with infinite patience, they tend to be more elderly people.

Straight Running. Modellers usually start with this class of boat, but quickly either turn to Radio Control, or commence building the entire boat, engine, etc. These latter are similar to the hydroplane builders and favour scale or near scale models.

Radio Control Steering. Usually the first type of event entered. The majority of boats are usually from the following classification but specialised boats are rapidly gaining a hold in this event.

Radio Control—Scale or Semi-scale. These modellers use Radio to get enjoyment out of just simply running their boats, they are not really interested in either clubs or competitions. They tend to stick to kits and bought accessories, with home built single channel or older type multi radio. Club members can usually be got to enter events where no damage is likely to occur.

Radio Control Speed. These modellers are generally not interested in whether it looks like a boat or not, so long as it will float and drive itself by sheer power, the result generally here is glass fibre hull, glow engine, lightweight radio and accessories.

Radio Control. These people usually fall into two groups.

1. Where a boat is just a means of putting the radio to use, generally competing in R/C speed or
2. Making the radio do the work of a crew on a full size boat.

Competition Events

Note. These notes are based on M.P.B.A. events as they form a national standard to work to.

Hydroplanes. Competitors seem satisfied with these rules so no alteration here.

Straight Running. There are many clubs unable to hold this event due to water conditions. It is suggested this event could be run on all waters and thus regain its falling popularity, if varying degrees of curve up to a semi-circle were allowed, so as to be able to retrieve boats from the bank side. Suggested change of name from straight running to free running.

Nomination. No change here. These rules would apply to free running as they do to straight running.

Radio Control Steering. These courses should be kept reasonably tight to assist electric boats, the buoys no wider than 3 ft. apart, and they should not become eyesight tests. Many competitors feel that hazards at 50 yds. become this. An all-in time should be used and some section of the course should include a reversing section, which if attempted, would score double points. This latter would advance development of clutches and gear boxes. Suggested change of name for R/C steering to R/C navigation (R/C/N). (This was suggested by Mr. Westbury).

Radio Control Speed Steering. This event causes a lot of controversy, the name is not liked and the event would appear to be neither steering nor speed at present. There should be hazards which are not hazards. Competitors feel this event will only have a short life. Suggested change of name to R/C speed navigation (R/C/S/N).

Radio Control Speed. The figure 8 course is not liked by some competitors who would prefer a larger course with more corners for more running time. A few other competitors would prefer no corners at all, just a straight dash up and down a measured course. This latter would perhaps form another event, but the difficulty here would be clubs with accurate timing equipment. This event could be called R/C speed records (R/C/S/R) classes as per hydroplanes.

Radio Control Pairs Racing. This name is alright at the moment but this event is in its infancy. In the future we shall see more than two boats competing at once. When this occurs, this name will no longer apply and it would appear that two different types of racing will be run, scratch and handicap as in full size practice, with Le Mans type starts and milling areas. Suggested change of name to R/C Racing (R/C/R).

Novelty Events. These are too numerous to deal with as every club has its own different variety.

General Notes. At the moment the people who can afford or construct light weight radio have an advantage, particularly in speed. An attempt is being made to try and eliminate this by introducing a weight/capacity rule. This is a step in the right direction but a return to formula racing may be the answer in the future.

Speed courses may also take a similar shape to one another with the removal of buoys as the events speed up.

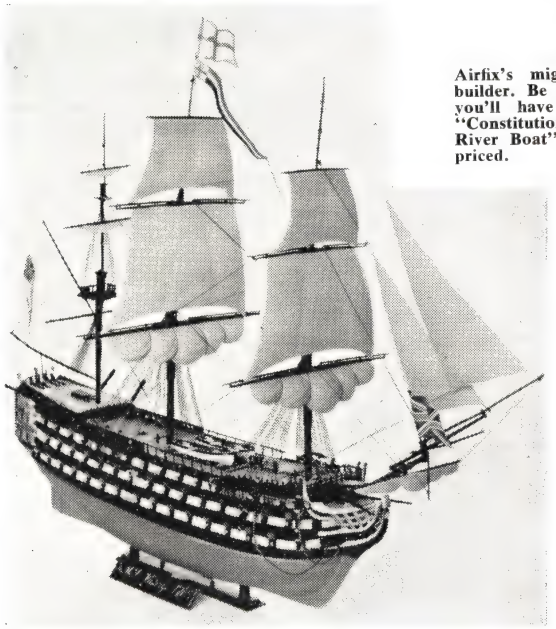
BATTERY TESTS (*Continued from opposite page*)

Significance of the results

Installed in a model boat, the Vidor HP2 could be expected to give a 10—20 per cent increase of performance over the Ever-Ready HP2 or up to 50 per cent over the Vidor V2. The high power cells cost nearly twice as much as a standard cell, but can be used for very much longer periods—the 18 discharges of the HP2 cells still did not reduce their voltage to that of a new V2 cell. Thus for economy, the new high power batteries represent an improvement, and of course where high power and light weight are required they are far superior to the standard cells.

The 24 hours recovery represents the minimum time for the cell to return to its original condition (though it never completely reaches it). Warming the cells during the recovery time seems to speed up this process, but there was insufficient time to investigate this fully, or the possibility of recharging cells at a very low rate, as some people have found successful.

TEST BENCH



Airfix's mighty H.M.S. "Victory" represents hours of patient work for builder. Be prepared to spend weeks, paint everything as makers advise and you'll have a great model. Below, left to right: Revell's giant U.S.S. "Constitution"—the ruler in the foreground is 12 in. "Kon-Tiki" and "Tom's River Boat", Schuco Hegi mostly-wood kits. Simple to build and reasonably priced.

Hard on the heels of Revell's recent plastic release of H.M.S. *Victory* comes Airfix with a larger replica of this famous ship. At 17s. 6d. for this 350 part Airfix effort, the prices compare well, both representing good value for money. The Airfix kit pictured here, the subject of this review, joins three other giants in the Airfix Historic Ships range viz., *Endeavour, Royal Sovereign* and *Revenge*, but must surely represent this energetic firm's "pièce de résistance". Length for this huge plastic is 23 in.

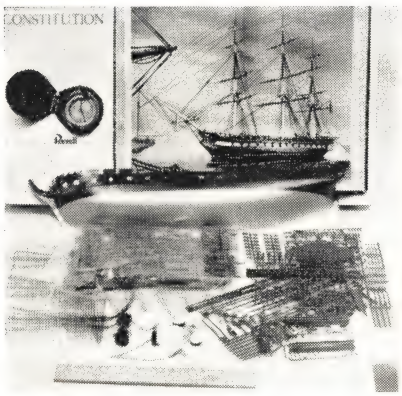
Talking of large plastics, here's another of the biggest we've seen, Revell's tremendous *U.S.S. Constitution* at 29⅝ in. long (large version: there is a smaller kit of the same boat at 16 5/16 in. long). Comprising 218 parts, this really superb kit sells in this country for what may, until the box is opened, seem a prohibitive £7.0.0. Our picture below does nowhere near justice to this large 2 ft. 5 in. x 1 ft. 4 in. photo illustrated box with its myriad contents including all thread required for rigging, two large rigging instruction leaflets, one ten page construction details booklet and an historic booklet about the full size "Ironsides". The hull even comes ready copper-bottomed.

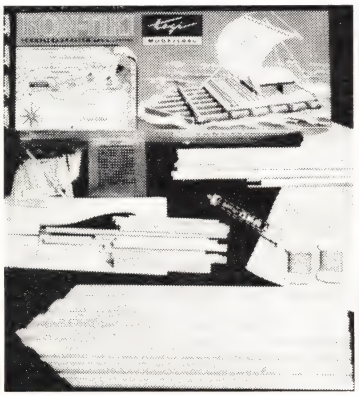
Away from plastics now and on to more conventional kits, although, in a way, these are unusual too. They are the *Kon-Tiki* and *Tom's River Boat* from Schuco Hegi of West Germany, pictured below. Both are dead simple to construct and, although angled at the younger boat enthusiast, we predict that many dads will find the temptation to 'assist in construction' irresistible. Both sell through Enterprise Models, Manchester for £1.6.6d. each, which isn't bad for working models; *Kon-Tiki* really sails and the *River Boat* is rubber powered for bath or small pool operation; it runs 2½ minutes on one winding.

Just received from Chas. Wise of Precision Model Engineering Ltd. is his new 'Precision Plastics Handbook'. Running to over 80 pages, this marathon effort illustrates and describes all plastic kits available today from all manufacturers. It's a pity that in many cases specific manufacturers' names are not listed with their products—we found it difficult to discover who produces what—but anyone familiar with the plastics hobby in general should be able to recognise brands. Price is 4/6d. from 53, Whitechapel, Liverpool 1.

Elsewhere in this issue will be found tests on the new Vidor dry cells pictured here. The smaller unit is the new HP 2 cell (H.P. for 'high power') while the larger battery (V28) is a 6V sealed unit for motorists' lamps, etc. Both have obvious model applications—especially the High Power series which our tests show to give longer and more powerful performance over conventional "U" series cells.

The Humber Oil Co's latest releases form our next item and are Customising Body Putty and a Fluorescent Paints pack. The Body Putty should find devotees among plastic modellers, being extremely useful for filling gaps and cracks on joints in hulls, decks, etc. It sells for 2/9d. a tube. The fluorescent colours could be useful for dressing up pairs racers and other fast boats or producing wild drivers for powerboats from monster kits, Weird-ohs and the like. Colours in pack are Fire Orange, Saturn





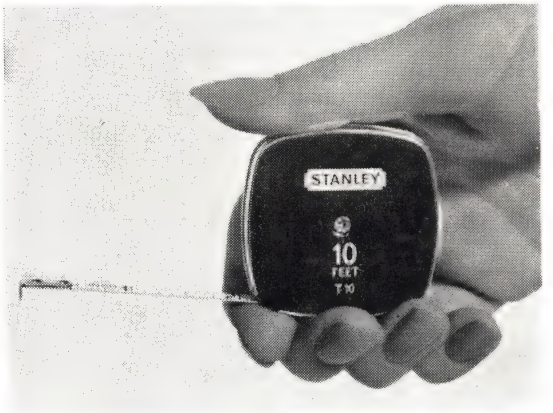
At right—new cells from Vidor showing the smaller H.P. 2 unit in the companies' new livery. Large 6v. pack is completely sealed, therefore waterproof. New from Humbrol are these two plastic modeller angled items, body putty and fluorescent paint pack. Note handy spreader on putty tube. Below—Stanley 10 ft. pocket rule, neat and slim. A 6 ft. version is also available. Dimensions are 1¼ x 1¼ in. and spare blades are available for replacement should the original become worn or damaged.

Yellow, Aurora Pink, Signal Green, and Base White (the reflector) and Clear Sealer are also included. Price for set of 6 handy 2 cc. vials is 3/6d.

An item that will be of use to modellers generally is this new, neat pocket rule from Stanley Works Ltd. Two versions are available, one measuring up to the usual 6 ft., the other, shown in our photo, to 10 ft., making this an ideal instrument for use in laying out courses etc. at regattas. ¼ in. wide blade on both models is highly flexible but will not stretch and produce inaccuracies and should last a lifetime —if it doesn't, spare blades are always available! Prices for this attractive, 2 oz. rule are 6/6d. for 6 ft. version, 8/6d. for the 10 ft. model.

A new and different range of kits is now being distributed by a Wembley firm, Anthony Goldsmith & Co. Ltd., which will be of considerable interest to period ship enthusiasts. These kits (made by Steingraeber) are unusual in that they are for rib-and-plank models of various types, all, except one, intended as either shelf or sailing models, and many of them capable of accepting radio control! Largest is the *Admiral Vernon,* a 1/75 scale French third rate of about 1695, 36 in. in length, the kit for which costs just over £10 and an additional set of fittings (for the detail fan) about £6, not an undue amount for a model of this size, complexity, and quality. Smallest (scale of other models is 1/50 or 1/60) is a 14 in. cog at 35/-, and there are some fascinating projects in between these sizes. Non-sailing is the *Agilis,* described as a clipper of 1840, but in fact a slaving brig—probably a translation slip, for these West German kits include English building notes which are clear and helpful, but obviously translated with the aid of a dictionary.

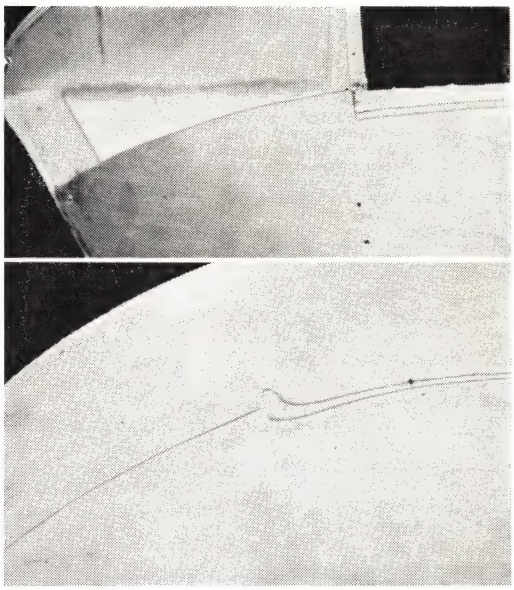
We hope to provide a detailed article on one particular model a little later.



French ship of the line, "Admiral Vernon" completed below from the Steingraeber kits described in the text. Very complete building instructions contain valuable colour gen and a brief history of the vessel itself. Despite their fairly high cost, we predict a bright future for these unique kits.

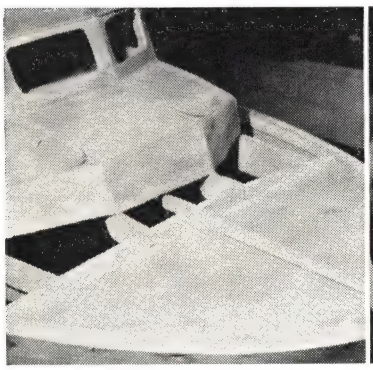
New glass-fibre hull

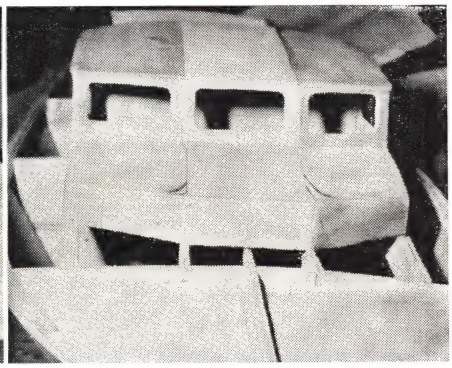
Magnal Laminations extend their range of glass fibre hulls with a new addition which cannot fail to be popular. The hull is to the *Remora* design (published Dec. 1964, M.M. & M.B.), a 30 in., 10¾ in. beam model of shallow monohedron V form. This hull has already been well tested and is ideal for small-class pairs racing or fast steering. Magnal's hull is available in red, white or blue gloss finish, has the designed spray strips moulded in, and retails at a modest 45/6d. through model shops. A standard red one supplied as a sample weighs 1 lb. 14 oz. and is immensely strong; allowing 1 lb. for radio, 1¼ lb. engine, and ¾ lb. for deck etc., the design weight of 5 lb. is within reach and at this weight a good 3½ cc. motor produces a smooth and deceptively fast performance.



Boating for Beginners

5. Decks and Superstructure





LAST time we had the bottom skins on and the motor mounted—next job is to prepare the sides of the hull for the side skins. This procedure follows the notes for preparation of the bottom of the model for the bottom skins, except that in this instance the overlap of hull bottom sheets at the chines will have to be trimmed away. Gunwale stringers can now be chamfered to the correct angle and, at the bow, the bottom skins can be 'stepped' to provide a smooth joint between themselves and the side skins when in place. This 'stepping' (see our photos) entails making a short vertical cut in the bottom skins down a line adjacent to the front edge of bulkhead B1 and trimming the for'ard overlap down to half the depth of the chine stringers.

We misread the instructions for this section (easily done) and only carved the bottom skin overlap down to the *top* edge of the stringers; it should, as we said, extend down half the stringer depth. Side skins can now be glued and pinned in place following advice for hull bottom skinning. When the bow is reached, it will be necessary to cut a matching 'step' in each side skin to fit into the step of the bottom skins. With care and constant checking (i.e. bending of the front side skins into position manually and marking in pencil area to be removed) no difficulties should be experienced.

When the side skins are dry, all pins can be removed and the holes filled with either glass fibre resin or balsa cement. Now comes the trimming away of surplus skin overlaps and preliminary rubbing down of the hull with a medium grade glass paper. With this done, we're on the last lap in construction. We glass fibred a strip of glass cloth over the joint in the skins between B1 and the stem to protect this otherwise vulnerable area from splitting due to future collisions with the bank etc., and rubbed this area down thoroughly until a perfectly smooth 'rise' from deck to lower keel resulted.

Attention can now be turned to decking and superstructure. The first job here is identifying and gluing into place the wheelhouse windscreen formers CF1 (2 off), WF1, WF2 and WF3. In our particular kit, these parts, especially the two CF1 components, were badly undersize and this necessitated the removal of CF2 and moving this member forward $\frac{1}{4}$ in. Only then would the 'egg-box' wheelhouse structure fit but even then, the individual components required severe trimming, slots opening out etc. The wheelhouse windscreen also gave trouble and we sliced ours into three separate pieces and fitted each piece individually. This made life easier. Similarly fit the forward cabin windscreen.

The wheelhouse roof is from three pieces of $\frac{1}{16}$ in. ply and these should be fitted so that joints are made over a former (CF1). It will be found necessary to chamfer adjoining edges to achieve good, smooth joints, and this method should always be used for butt joining thin ply at an angle. Note that this uppermost roof overlaps at the front and sides by $\frac{3}{32}$ in. unlike the forward lower roof which is fitted in three parts in the same manner but whose edges are flush with the cabin front and sides.

A support for the foredeck can now be provided by cementing a length of $\frac{1}{4} \times \frac{1}{8}$ in. strip, $\frac{1}{8}$in. edge downwards, into the slot in B1, running from beneath the forward cabin to the stem as shown in our pictures. This can now be sanded to a wedge shape using a piece of medium glass paper over a flat wood block, taking the top of B1 as the highest point of the wedge and smoothing out to deck level at the stem. Now the foredeck can be trimmed to fit (2 parts), removing just a thin slice of timber at a time until each half fits snugly around the forward cabin front. When joining deck pieces, again arrange it so that all joints are made directly over a supporting piece of timber (this is how Aerokits designed it and that is how it should work out, but we mention this

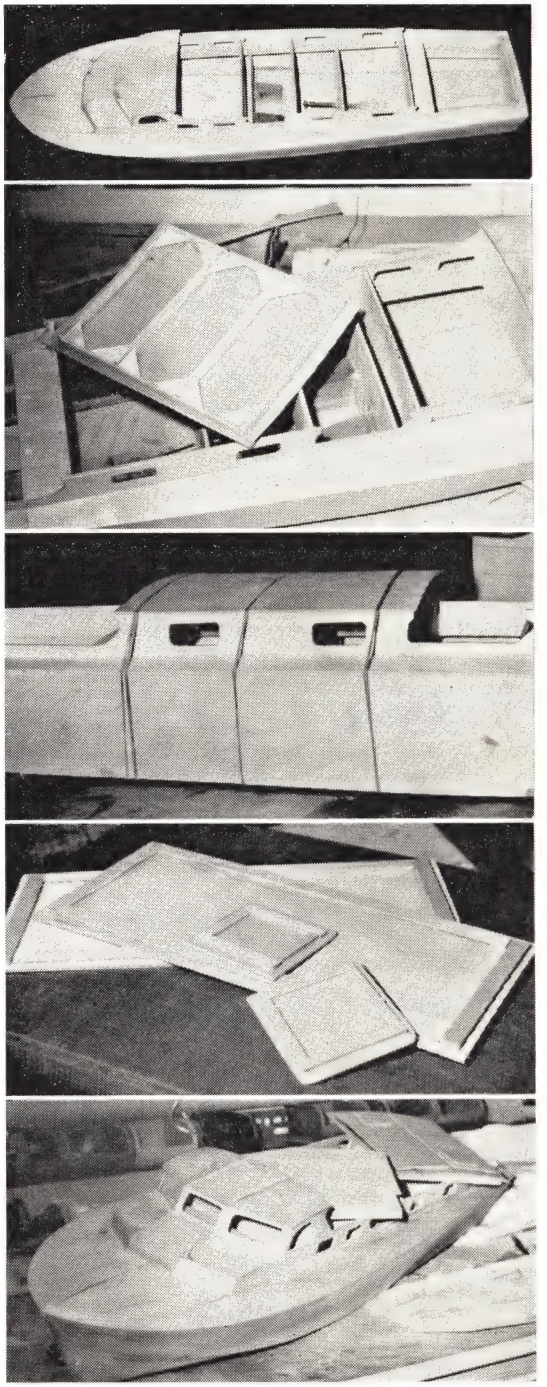
because deck pieces will undoubtedly require trimming—as ours did—to achieve this design feature).

With regard to the smaller sheet of sketches and building notes, the manufacturers have goofed in their small plan view of the deck assembly. The deck is, in fact, covered with 7 pieces of timber—not 5 as stated; the rear side decks (in our kit, at least) were formed from two separate bits of wood. Press on with the decking, moving to the two main side deck strips. Run the glass paper block over surfaces onto which they will be cemented to ensure that all is flush and flat. Side decks can now be pinned and glued in place. Repeat the procedure for rear side deck pieces and rear deck, noting here that for the rear deck, a piece of correctly grained timber (i.e. grain runs *across* a thin strip of ply to allow for bending to the correct camber for this area of deck) is supplied. A similar piece for towhook deck is also provided, and this timber bends to the correct curve so easily that steaming or soaking to shape is unnecessary.

Now we turn to the two removable hatches and, since these can give trouble if tackled incorrectly, we will cover these extra carefully. We'll take the engine room roof/hatch first. CR1 is the number given to the 7 pieces of $\frac{1}{8}$ in. ply which, together with pieces of $\frac{1}{4} \times \frac{1}{8}$ in. strip, form the framework of the hatches. Four off CR1 are required for the engine room roof section, and two of these should be trimmed down slightly at each end until they fit into the engine room opening, held lightly by friction across the hull between the cabin sides. $\frac{1}{4} \times \frac{1}{8}$ in. stripwood should now be measured carefully and placed in position along the hull, flush with the cabin sides, between these two CR1 end pieces. A ply gusset (enough are provided) can now be cemented into each of the four corners. Two more CR1 should now be trimmed to fit between the cabin sides plus the extra thickness of $\frac{1}{4} \times \frac{1}{8}$ strip at each side. These can be cemented in place, roughly dividing the hatch up into three equal areas. At no time allow cement to get between the sides of this frame and the cabin sides—the frame will be lifted out at a later time and if cement should get into any of the wrong places at this point it will be impossible to do anything about it once the roof itself is in position.

Complete the installation of gussets (four more to each of these centre cabin roof formers) and, after checking that the top edge of the frame is exactly level all the way round with the top edge of the cabin sides, allow to dry thoroughly. When dry, the $\frac{1}{16}$ in. sheet of ply that forms the cabin roof can be cemented into place. Again be specially careful to cement only the hatch frame to the roof. The roof can be held in place with the correct amount of curvature with rubber bands until completely dry—see pics.

The same procedure goes for the centre cabin roof/hatch with the point to note that at the for'ard end of this hatch, the sides must be trimmed to fit between the cabin sides; this is all clear from the detail sheet of instructions. When both roofs are completely dry, removal of hatches can take place. Ours came out quite easily with only a little easing all round with a screwdriver to break them completely free from tiny blobs of cement that had spread onto the cabin sides (be warned) during construction. The cockpit floor drops into the cockpit well to rest on the $\frac{1}{8} \times \frac{1}{4}$ in. strips previously fitted—our $\frac{1}{8}$ in. thick piece of ply for this floor was badly warped and quite unusable; it is essential that this floor sits flat in its well.

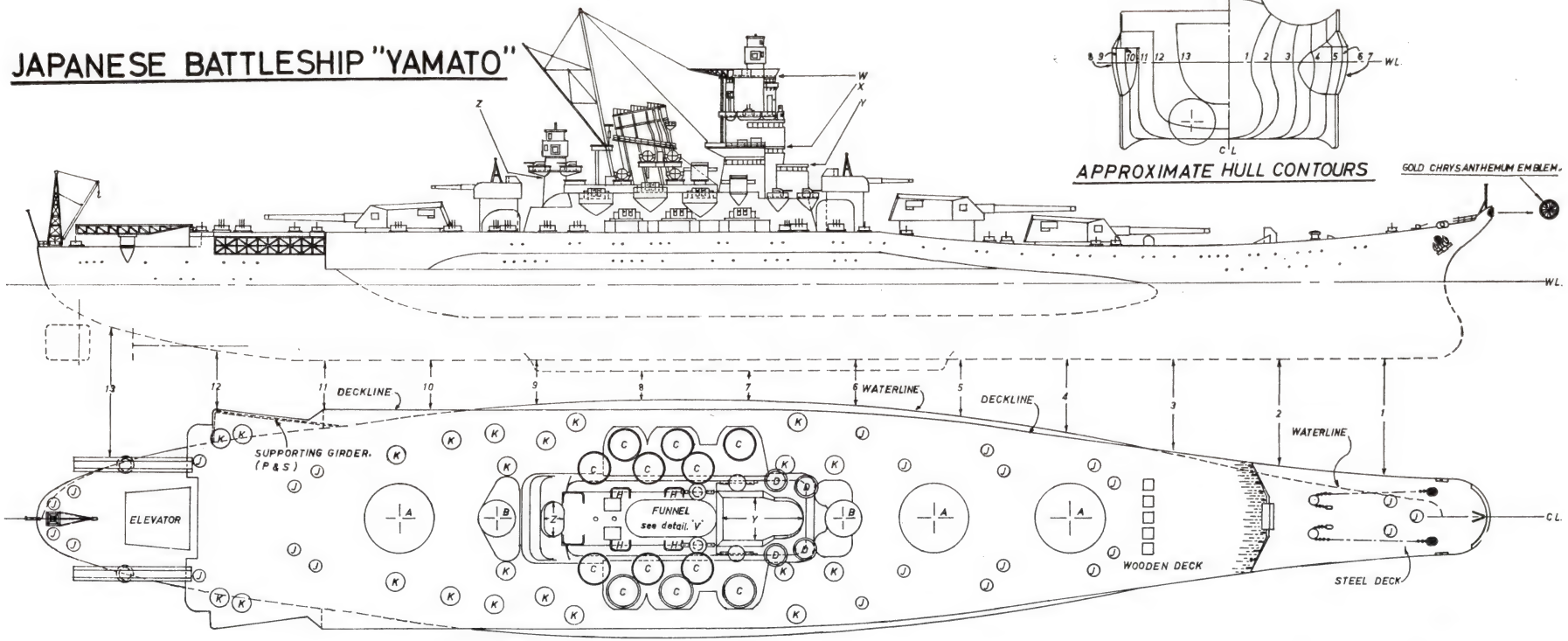


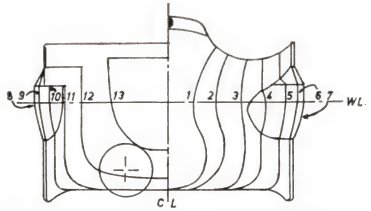
When radio installation time comes it may be found necessary to screw this floor down as a precaution against water intake—we shall see.

The covers, hatches and coamings (part 25 in Aerokits instructions) come next and we found it

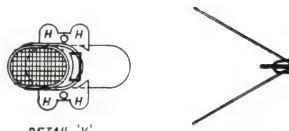
Continued on page 86

JAPANESE BATTLESHIP "YAMATO"





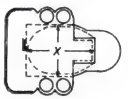
APPROXIMATE HULL CONTOURS


DETAIL 'V'

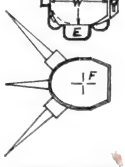
MAST DETAIL

SECONDARY ARMAMENT - 'B'
155 m.m.- (6.1 in)

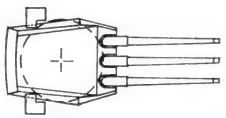
A.A. GUN - 'C'
127m.m.- (5in)

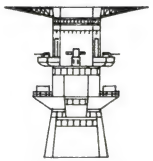

SECTION AT 'X'

SECTION AT 'W'


A.A. COMMAND POST

BRIDGE DETAIL


MAIN ARMAMENT - 'A'
460 m.m. (18.1 in)


BRIDGE FRONT

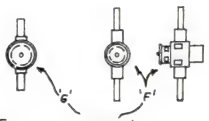
A.A. GUN - 'K'

A.A. GUN - 'J'

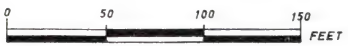
A.A. GUN - 'E'
13 m.m.

A.A. GUN - 'D'
25 m.m.

GUN & DIRECTOR TABLE.
see section - Z


'G'
'F'
DIRECTORS

SEARCHLIGHT - 'H'



YAMATO

The biggest battleships in the world, Yamato and Musashi, were both lost within six months.

Drawn and described by W/O J. Day.

THE *Yamato,* with its sister ship *Musashi,* were built for world conquest, the designers being told to produce the most powerful battleships afloat. This they did, the ships being of some 63,000 tons Standard, 72,400 tons full load, nearly half as heavy again as any other battleship of any country. They were 863 feet in length and had a beam of 131 feet. Their main batteries were the largest ever fitted to a warship, being 460 mm. (18.1 in.) in calibre, nine of them, each barrel weighing 180 tons. They were completed in 1941, but were not used in combat until nearly three years later.

Both ships, as part of the Combined Fleet under Admiral Kurita, sailed for Leyte Gulf in the Philippines on October 23, 1944, their objective being to destroy the U.S. ships mounting the landings in the Philippines. So started the multiphased battle that was to leave the U.S. Navy irrevocably supreme in the Pacific waters.

The Combined Fleet was first sighted by a submarine and subsequently by aircraft. Having received reports of the sightings, Admiral Halsey, U.S. Fleet Commander, sent off air attacks on the morning of October 24.

During the attacks *Musashi* was hit with ten torpedoes and sixteen bombs. The bombs caused considerable topside damage and the torpedoes, which were equally divided between port and starboard, caused severe flooding. Her death throes lasted for about four hours until the evening, when she gave a lurch to port, capsized and sunk sharply by the bows, taking over a thousand of her crew with her. She was the first Japanese battleship to be sunk purely by air attack.

The *Yamato* during this time had been hit by bombs which made her heavy by the bows but she was still capable of 26 knots and her main armament was still intact.

On the morning of the 25th, *Yamato,* with its attendant fleet, came upon the unguarded Light Carriers of the U.S. Fleet. The *Yamato* opened fire with her 18.1 in., the first time in naval history that guns of this calibre had been fired in anger. The Japanese Fleet pounded the carriers for two and a half hours in a stern chase, but owing to the heroism of the American escorting destroyers and the need to gather up his widely scattered fleet, Admiral Kurita broke off the action. The Light Carriers took this opportunity to launch air attacks and claimed two probable hits on *Yamato.* At midday, Admiral Kurita broke off the complete sortie, only two hours from his objective, having lost half of his force.

During the four separate actions that comprised the Battle of Leyte Gulf, the Japanese lost twenty six vessels to the Americans' six.

The *Yamato* did not battle forth again until April 6th, 1945. By this time the U.S. Forces had made a bridgehead at Okinawa and were closing in on the Japanese Empire. The Japanese decided to send the remainder of the Combined Fleet on a suicide mission to destroy the bridgehead.

With only sufficient fuel to reach the bridgehead and accompanied by one cruiser and eight destroyers, *Yamato,* under the command of Admiral Ito, left the Japanese homeland for the last time. At midday on April 7, the fleet was attacked by 350 planes from a U.S. Task Force. During the attack which lasted nearly two and a half hours, *Yamato* was hit by eight torpedoes on the port side and by two on the starboard side, which caused serious flooding. The ship's trim could not be restored so it was decided to abandon ship. With the ship's list to port increasing rapidly, she was again hit by a torpedo and three minutes later, when the list had reached twenty degrees, she was racked by explosions which sent the ship into a sharp plunge.

With her sinking, taking nearly 2,500 of her crew, the Imperial Japanese Navy died.

FACE-LIFT *(continued from page 64)*

has been a very dry boat even in rough weather when the deck has been continually awash.

The method of installation of radio and intergear having been determined there was one more alteration to be made to the hull before its weight could be checked—that to the rudder which had been found insufficiently effective.

The general consensus of opinion among R.C. yachtsmen is that the deeper the rudder, within reason, the better. When the hull heels over the upper part of any rudder is very near the surface of the water and is, therefore, comparatively ineffective.

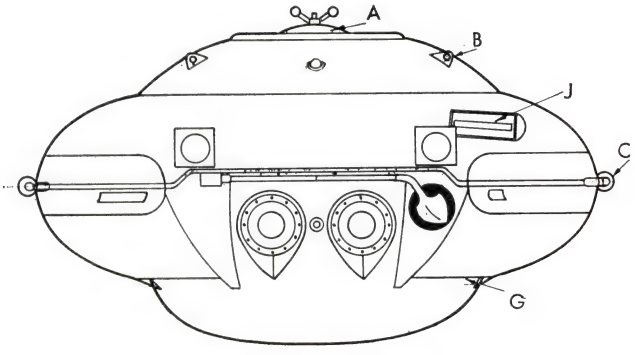
A new rudder was made (Diagram 1) giving above 2½ times the area of the original which was, in effect, only a trimming device to hold the boat on a course in conjunction with the vane gear. The new rudder was also made about 1½ in. deeper than the original and was purposely made rather larger than was anticipated would be necessary as it would be very much easier to reduce the size than make a new rudder, but eventual trials showed that it worked as desired and no subsequent reduction in size has been made. *(to be continued)*

WILD SWAN *(continued from page 58)*

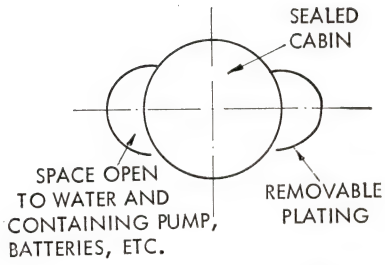
The four years spent in research and in building the *Wild Swan* have resulted both in a successful sailing model, and in the production of the most accurate model of the prototype I know of.

As a spectacle, the model is more interesting in close up or without sails. Under sail she looks very like any other model barque and the detail is lost at a very short distance away. The hull lines with very little curvature in plan do not appeal to me and for my next enterprise, I am returning to the more curvaceous lines of the earlier sailing warship.

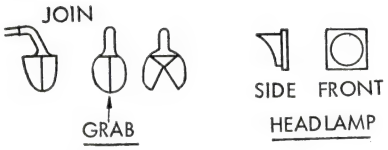
However, for anyone who likes interesting detail, I would wholeheartedy recommend the transitional period. We shall never see its like again.



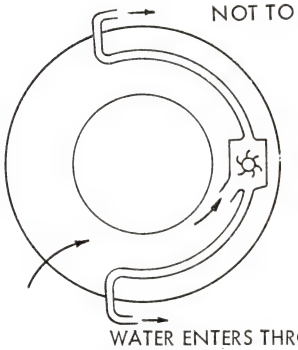
BOW VIEW



SCHEMATIC DRAWINGS OF PROTOTYPE



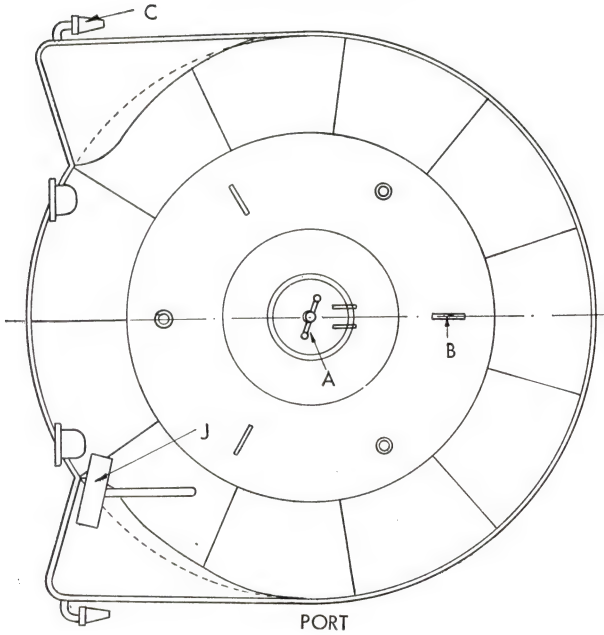
NOT TO SCALE



SECTION THROUGH PORTHOLE
(NOT TO SCALE)

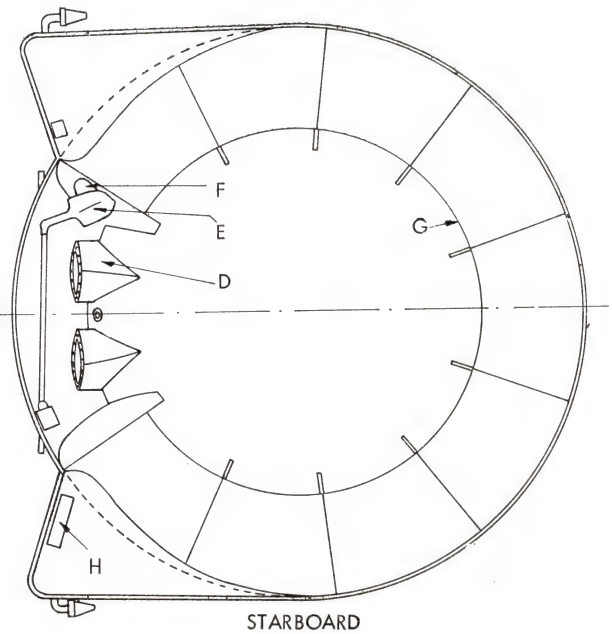
WATER ENTERS THROUGH G AND IS PUMPED INTO JETS C

PLAN VIEW - FROM ABOVE



PORT

PLAN VIEW - FROM BELOW



STARBOARD

Denise

Jacques-Yves Cousteau's underwater machine, drawn and described by K. Gilman

Denise is one of the remarkable inventions of Commander Jacques-Yves Cousteau, who has received much publicity over his plans for undersea villages and fish farms.

Denise is basically a two-man diving bell, but she is built to be completely manoeuvrable at depths to 1,000 feet. Propulsion is by a 2 c.v. (about 2 h.p.) motor-pump supplying two movable jets mounted on stub wings. Speed is 1 km per hour (about ½ m.p.h.), which is slow enough to ensure perfect manoeuvrability and avoid disturbing underwater life.

The motor and accumulators are enclosed in an outer doughnut-shaped casing, which is open to the water. High-pressure oil protects the pump and batteries from seawater.

Some trouble must have been experienced in the diving and resurfacing of the saucer, for now this is accomplished by using two 25 kg (about ½ cwt.) weights. Two are carried (slung beneath the bell) for a dive; one is dropped for cruising, and the other is jettisoned for resurfacing.

The crew lies face down on two bunks behind the twin portholes. It must be a full-time occupation operating the lamps, still and movie cameras, and the grab used for collecting specimens.

The plan was drawn from photographs only and any inaccuracies, minor or otherwise, must be excused. Photographs of *Denise* have been featured in "Paris-Match" and in the National Geographic Magazine (sorry, no idea of date).

It would not be impossible to make a working model of *Denise*, and the low scale speed would make operation possible in a large aquarium or lily-pond.

Key to plan

A Hatch cover
B Lifting Lug
C Propulsion jet
D Observation port
E Grab in rest position
F Specimen container
G Water intake to peripheral "doughnut"
H Lamp
J 2.5 kw. floodlight

Colour scheme

Hull: Yellow
Lamp casings: Steel grey
Shock-absorbing strip around hull: Black

PROPELLERS—

Continued from page 73

of the boat 'U'. However, such a system is fundamentally inefficient, and is only suitable for very high power craft.

As a final word to model enthusiasts it must be emphasized that streamlining boat hulls is essential for good performances. This particularly applies around the propeller; shaft supports should be kept to a minimum, rudder stems and diesel engine cooling water intakes should be streamlined,—aeroplane wing fashion—and the hull finish should be as smooth as possible. One more thing: avoid overloading the hull; it is detrimental to have a hull floating below its design water level, especially with planing hulls, because the boat will tend to produce unduly large waves which only waste power.

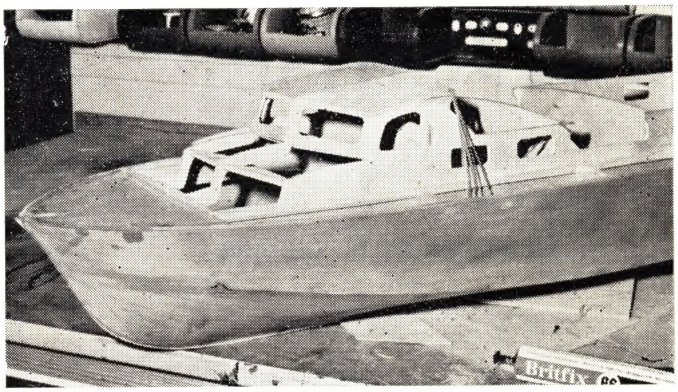
MOTOR	POWER RATING (Watts)	WORKING SPEED RANGE (R.P.M.)	SUITABLE HULL SIZE (INS.)	PROPELLER DIAMETER (INS.)	PROPELLER PITCH (INS.)
KAKO 3	4-8	4 to 6000	16-24	1¼	1
,, 4	5-9	3-5000	20-28	1½	1¾
,, 5	6-10	3-4000	22-30	1¾	2¼
ORBIT 3	4-8	4-6000	16-24	1¼	1
,, 4	5-9	4-5000	20-28	1½	1¾
,, 5	6-10	3-4000	22-30	1¾	2¼
,, 6	7-11	3-4000	24-32	1¾	2¼
TAYCOL COMET	4-8	4-6000	16-24	1¼	1
STAR	4-8	4-6000	16-24	1¼	1
TARGET	5-10	3-5000	20-30	1½	1¾
ASTEROID	5-10	3-5000	20-30	1½	1¾
TORPEDO	8-14	2-4000	24-36	1¾	2¼
METEOR	8-14	2-4000	24-36	1¾	2¼
S. MARINE	10-20	1.5-2500	30-48	2	2¼

Submarine operations

Neat idea for an automatic diving device for electric submarines comes from B/E C. J. Campbell of R.A.F. St. Athan. A float chamber is built into the base of the conning tower, a metal section on the float centre staff bridging contacts in the tube. The submarine is set to dive on the hydroplane and as it slides under, the float chamber floats. As the float rises, its staff slides up the tube and breaks contact, which switches off the drive motor.

The slight positive buoyancy of the boat brings it slowly to the surface, the float chamber drains and the float drops, once again bridging the contacts, switching on the motor and restarting the sequence. The only adjustments required for trim are to the hydroplane angle and to the fixed ballast, to balance diving force and buoyancy.

BEGINNERS *Continued from page 81*



simplest to build these up completely and then fix them as separate units to the engine room roof. 1.5 mm. plywood strip is supplied and this should be cut into lengths of the correct size to form a border around the ply hatch shapes about $\frac{3}{16}$ in. in from the edge—as in the photos. When these are dry, the two larger covers can be cemented onto the engine house roof and held in place with rubber bands. It will be just as well to introduce a slight curve in these pieces before final positioning, steaming being the method recommended here. When dry, the smaller hatches can also be glued on using Aerokits plan for correct positioning. Hinges and the like should be left at this stage—these come under "details" and will be dealt with when the appropriate time comes.

All that remains now in basic construction (we consider the building and fitting of details as a part of the "finishing" procedure and we'll duly come to these) is the fitting of four rubbing strakes from $\frac{1}{8}$ sq. strip to chines and deck edge. For this, dressmakers' pins as opposed to the heavier brass tacks we have been using should be pushed through the strips to hold them in place while the glue dries—use of these thin pins lessens the risk of splitting the thin strakes.

Next month we'll deal with fitting a skeg to the proptube and preparing the hull for its first undercoats; then on to the radio and final motor installations.

WORKING MODEL DRAWINGS

As well as the Aeromodeller/Model Maker Plans Service list—the well-known Plans Handbook, which costs 2/- post free—we have now produced an 'interim' list of ex-Percival Marshall drawings of locomotives, traction engines, petrol engines, power boats, yachts, sailing ships, workshop equipment, and miscellaneous models. This list is now available, price 1/- post free, from the proprietors,

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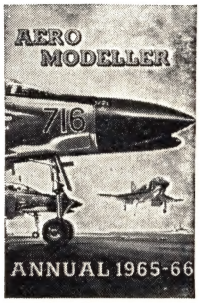

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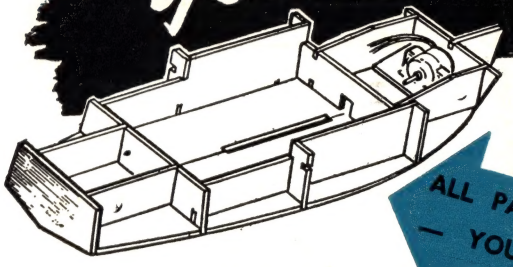

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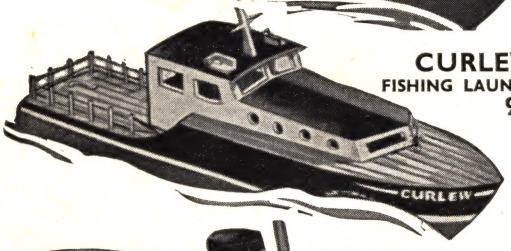

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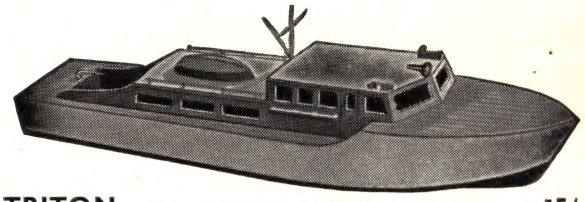

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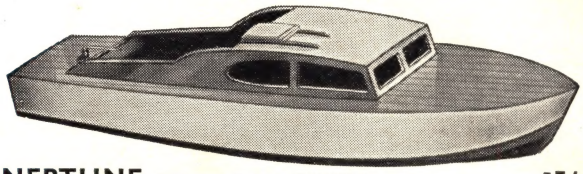

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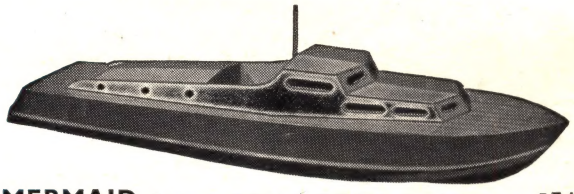

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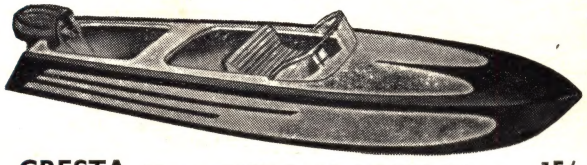

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